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CONTENTS

FISHERIES AND WEATHER 109

MARINE FISH STOCKS OF SOMALIA 119

CONFERENCES AND MEETINGS 122

FISHERIES DIVISION ACTIVITIES 130

NOTES ON FILMS 147

NOTES ON PUBLICATIONS. 148

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The FAO Technical Assistance Program in fisheries is utilizing material and personnel from many parts of the world. Here, the tuna fishing boat *New Hope* is shipped in San Pedro harbor, California, U.S.A., for transfer to Somalia. On that project experts from the United States and the United Kingdom were utilizing material not only from the United States but also from Denmark, England, Italy, Japan and The Netherlands (see pp. 119).

FISHERIES AND WEATHER

A fisherman never ceases to be conscious of weather. His craft and his gear bear witness to his expectation of weather to be encountered. His operations are subject to weather conditions, which may determine the success or failure of his work and, when unfavorable, not infrequently cause the loss of craft and gear and life. Moreover, inclement weather, chiefly excessive heat, may cause the loss of the catch by spoilage. He must, therefore, have some understanding of the general climate of the region in which he works, and some means of judging what the weather is likely to be a few hours, a few days, or a few months hence, according to the length of time on which he would wish to be engaged on a particular operation. He needs to have some idea as to whether it will be favorable for his operation (or to what degree unfavorable) and for how long it will continue so ; he particularly needs warning of when the weather might become unfavorable especially if that might also mean danger.

Traditionally, fishermen have established a weather lore for themselves and hour by hour interpret signs observable by them, and in this, as in most other matters, they have had, generally, to rely upon their own initiative and ingenuity to devise a campaign in this battle with the elements. However, a single observer can only guess at what lies beyond his horizon, and can have no inkling of weather which, although approaching rapidly, moves some hundreds of miles away. Now that we know that modern equipment for observing weather and for communicating information have greatly improved our understanding of the behavior of climatic elements and our foreknowledge of that behavior, it would be unreasonable to continue to rely upon mere local lore. Moreover, with the growth of corporate responsibility toward special sections of the community, the problems of the fishermen, as constituting one such group, are receiving more attention and the time is ripe to review our understanding of the relation between weather and fisheries and what is being done to improve that understanding, and our use of it.

In this review we may separate the problems of craft, gear and fishing operations from those of fish stocks, as related to climate and weather. In both cases we may consider the bearing which general, long range meteorological information has on such matters as the design of craft, and the distribution and abundance of fish ; we may then consider how short-term, seasonal information and predictions may effect the planning of fishing operations, and how such information may be made use of in predicting the behavior of fish stocks. Again, we may consider the use of day-by-day weather forecasting in the conduct of fishing operations and especially in relation to safety at

sea. Lastly, we should also consider these matters from the points of view of:

(*a*) the use which is made of available meteorological information in these various connections,

(*b*) the better use which could be made of information which is at present available, and

(*c*) how meteorological services could be improved for the benefit of the fisheries industries.

I. Climate and the Design of Fishing Craft and Gear

To say that fishing craft are designed for climate, and sail in weather, provides an illustration by which to establish the distinction between weather and climate. *Weather* signifies the conditions (of temperature, wind, rain, etc.) which occur at a given place at a particular time ; *climate* is the pattern of such conditions prevailing over an extended period of months. The climate is indicated by average values of these conditions within each season, or period, and the range and frequency of variations about these values.

The measurement and understanding of these mean values and variations determine to a large degree the principal details of the design of the craft. After the decision on the purpose and general characteristics of the craft, its general lines and the disposition of weights, which determine sea-worthiness and sea-kindliness, are designed very largely with a view to the average and extreme conditions which the craft will be called upon to sustain. These matters were discussed in this bulletin by Traung (1951). Again, the arrangements for accommodation, especially in respect of ventilation, and the provision for inboard storage of fish, are substantially affected by the climate in which the craft will operate. In the simplest form of the proposition it may be stated that a vessel should be designed for the climate in which it will be used ; craft designed for temperate to cold waters and taken to tropical waters, have been successful only after substantial alteration ; however, even with alterations, such craft have sometimes proved unsatisfactory. In more advanced form the proposition relating craft design to climate would suggest that more detailed climatic analyses should be sought and applied to the problems of design so that, on the one hand, the craft should more closely conform to the requirements of the average values of the climate and yet, on the other hand, have some measure of adaptability to accommodate the extremes which occur. An extremely interesting example of this type of problem is given by recent work which this Division has done on the analysis of the design of craft which are used on ocean beaches.* These must be specially constructed in relation to

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* A report will be given of this work in a later bulletin.

the particular conditions, primarily the weather determined sea-surface conditions, which they encounter in the surf or on the beach.

In a more remote way the climate of an area exercises an influence on gear design in so far as the design is partly [1] determined by movement of the water in which the gear must operate,[2] and the movement of the water is affected by movement of the atmosphere, as discussed below.

II. Fishing Operations and Weather

In the conduct of his operations the fisherman continually takes decisions which involve a reference to weather; to proceed to sea, what course to set, when and where to fish, when to pick up his gear, and so on. With one eye to the market, his decisions are taken according to the weather at the moment and his knowledge of, or guess as to what the weather will be a little later. The fisherman thus has a great need for reliable weather information, and much advantage would accrue from improvement in weather services for fishermen. The need is especially important, and in some ways greater than that of the commercial navigation lines or at least more urgently requires development, because (*a*) the nature of his operations requires the fisherman to "stay with the weather," and (*b*) because fishermen in most cases operate away from the usual traffic lanes. Further, the urgency is increasing now because, all over the world, fishing operations are being pressed beyond usual limits into areas in which the traditional lore of fishermen ceases to have effective relevance.

Two types of information may be considered: firstly, general seasonal predictions; secondly, day-by-day (and even, within-the-day) predictions. The latter is of the established and recognized kind, and already is being furnished to fishermen in many countries. Much progress has been achieved in certain countries in the development of meteorological services for fishermen and advantage should be taken of the experience gained by these countries in planning and organizing similar services in other countries. However, there is a need, even in advanced countries, for further development of the meteorological service in itself, comprising observation and analysis and of the service for communicating the observational information and the prediction to the fishermen.

The other type of information, namely a seasonal prediction, involves a slightly different approach. It is related to the fact that of any fishing season only a proportion may be used by the fishermen for fishing. If a fishing fleet could be given some over-all prediction of the general character which the weather would be likely to have during a forthcoming season it might be possible to make adjust-

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[1] the other major part being fish behavior.

[2] By movement of water is meant the movement of water relative to the gear, whether the gear is stationary at a geographic point and the water moves through and past it, or the water is still and the gear shifts its geographic position.

ments in the plan of operations according to whether a low or high proportion of fishing days was likely to be available. An especial example of this type of information would be the prediction of the onset of the monsoon.

These general observations on the effect of weather on fishing are not merely theoretical speculations on the possible efficiency of fishing fleets. The effects of weather mean money and life to fishermen. In the North Atlantic and Arctic we might point to certain critical zones — in particular the coasts of Iceland, where several first class vessels are lost every year, and where many more are damaged and nearly lost through groundings. Many trawlers en route from Bear Island, Spitzbergen, Skolpen Bank and the Murman Coast grounds via North Cape to British and continental ports commonly use one or both of the north and south routes inside the protected Coastal waterways to avoid driving through storms with a laden ship along the direct off-shore route. This concentration of shipping in the fjords is not only costly in time and pilotage, but also has resulted in the past in very frequent groundings. Yet the *Ernest Holt* (Ministry of Agriculture and Fisheries) has shown that it is quite possible to save 24 hours by steaming directly from North Cape and shaping course to England with reference to the more or less predictable cycle of gales so as to dodge their full impact.

We may consider the value of improved weather information along two lines : firstly, improvement in fishing operations; secondly, prevention of losses. As to the first we may mention reduced steaming time to fishing grounds, avoidance of weather which prevents fishing and increased operating time on the grounds. With reliable weather information the fisherman can make an estimate of risk and decide whether to depart on a voyage ; or make a choice of fishing ground. When a voyage has started there is a point of no return, unless most extreme conditions should arise ; but on the grounds the short term forecasting can guide the fisherman as to whether he should remain where he is, or change his position.

It is unnecessary to stipulate the importance of prevention of loss. The risk element in sea-going operations is familiar to everyone, but perhaps the magnitude of the capital investment in craft and gear is not as familiar ; the paper by Traung, referred to above, gives some figures of investment in craft in the United States and other countries. Insurance on fishing craft and gear is a difficult matter and in some countries such insurance is not available, or only at very high rates. Recently, the Canadian House of Commons heard an announcement that the Government would introduce a scheme of insurance on boats and gear; this is a provisional scheme, of limited application, but it contains a novel feature : insurance is offered to lobster fishermen against storm losses suffered to their traps. This is a development of great importance.

Weather services for fishermen have been established in many countries, and their effectiveness is greatly extended by the availability of radio in its various forms. Japan, the United States, and various

European countries have these services and are extending the radio networks over which the information is communicated to the fishermen. More could be done, especially in critical areas such as those which lie in the path of typhoons, for instance, the China, and adjacent, Seas. Moreover, much could be done in ensuring that radio equipment was carried by sea-going fishing craft. In most countries of the world all vessels above a certain size must have radio equipment. Requirements in this regard could be extended to a wider range of fishing craft, and at the same time assistance could be given in the procurement and installation of such equipment.

Commercially some attempt has been made to provide the kind of forecast which the fisherman needs. In the United Kingdom there is at least one commercial meteorological service under contract to some fishing firms to supply the special kind of forecast required. A special characteristic of it is that it is much less noncommittal than the official forecast, and takes a chance on probability in advising for or against operations in a particular area. This suits the skipper who, after all, cannot be noncommittal and wants an indication of probability, as well as certainty.

Industry has taken steps in this direction in the United States and elsewhere, and this draws attention to another aspect of the problem, namely, the part which fishermen might themselves play in the development and improvement of these services. Some fishermen may scorn the services offered them, saying that the information generally confirms their own observations of what they had passed through in the previous 24 hours. However, the majority wish to have weather forecasts, and since they recognize the value of the service they most probably would be prepared to make some contribution to the task of observing and recording weather. This would be especially valuable because very often fishermen are the only observers present in some areas.

III. Climate and the Handling and Processing of Fish

The effect of weather on the methods and design of equipment for handling and processing fish is very strong. The contribution of high temperature to spoilage of fish is great, and humidity is a controlling factor in drying and smoking. Fish holds must be constructed according to the temperature of air and water on the grounds and during the voyage from the grounds ; similarly, transport and storage equipment is designed according to the climate in which it is to operate. The design of fish drying and smoking equipment is similarly subject to the climatic regime, and modern equipment often includes expensive control equipment intended to give automatic adjustment to changes in weather, and some measure of independence of the general climate. When the installation of equipment is contemplated, it is necessary to obtain meteorological data concerning the site proposed for the plant ; very often special observations must be taken because the observational

network of the meteorological service does not furnish information in sufficient detail. During operation, efficiency could be increased by the availability of predictions of weather, especially of temperature and humidity changes.

IV. The Bioclimatology of Fisheries

The influence of weather on fishing operations is the more readily understood aspect of this problem, but there exists a deeper and undoubtedly more far reaching relation between fisheries and climatology arising from the effect of climatic elements on the fish stock themselves.

There are various indirect effects of climatic elements on the biota by way of their influence on the water masses. Two of these effects may be mentioned. Firstly, the effect of precipitation and run-off on the composition of water and, secondly, the influence of climatic elements on inland and sea waters in causing and contributing to the cause of water movement.

Precipitation has an obvious effect on inland waters which is perhaps more immediate and more substantial than its effect on the marine. But, although the relations between precipitation and the biota of the marine environment might be extremely attenuated, precipitation does affect the temperature and salinity of the surface waters and undoubtedly must thus influence the biota of those waters. Conversely, the lack of precipitation may be accompanied by a rate of evaporation which may lead to increase in salinity. These effects are probably greatest, and certainly most noticed, under estuarine conditions and some notable recent contributions on estuarine hydrology have reported the measurement of run-off, evaporation and mixing in those situations (Rochford 1951, Ketchum 1951, Ketchum and Keen 1953).

In both marine and inland sectors, there is a vast field of work in respect of the influence of climatic elements on water movement. There is here a simple aspect of the importance of these water movements to navigation, and in the transportation of biota ; and there is a deeper aspect, of more complex implication, in relation to the distribution of properties within the inland waters and the oceans and, through the distribution of those properties, in relation to the nature, habits, distribution and abundance of the biota. For a detailed account of surface conditions and the relation of those with weather, we may cite the book *Coasts, Waves and Weather*, by Stewart (1945), which is admirably illustrated. For more profound analysis of water movement and its relation with atmospheric movement one can hardly do better than refer to Sverdrup, Johnson and Fleming : *The Oceans* (1942).

Whilst the general nature of the relations between climatic elements (temperature, air movement and air pressure) and water movement has been extensively studied and is fairly well understood, there remains a broad field of work in analyzing the details of such relations

in particular situations and in developing systems for the prediction of the water movements from data provided by meteorological work which, after all, are the more easily obtainable and are much more abundant than the data on water movement. The internal correlation of water movement with distribution of biota and of properties of the water is the task of oceanographers and limnologists, but it will often be necessary to maintain the data from meteorology within the sets of equations describing such situations; that is to say, it may be, in certain cases, that the total effect of the meteorological elements might not be presumed to be sufficiently introduced by the measure of the water movement itself. On the other hand, it seems possible that in some cases correlations may be taken directly between climatic elements and certain biotic phenomena. Thus, Carruthers, Lawford and Veley (1951) have shown a correlation between certain wind data and the success of broods of certain species of fish, and they suggest the possibility of some useful predictions. Although the usefulness of the predictions has been challenged (Graham 1951, Gulland 1952, also Carruthers, Lawford and Veley 1952) their proposition carries an element of conviction, derived from the undoubted, if remote and as yet not fully understood connection between brood survival, water and atmospheric movements (*see* review by T. W. 1953).

The relations between biota and water movement may take a number of forms which, in the case of simple currents, might perhaps be grouped in two classes :

(1) those in which the biota is passive, as in the case of plankton (especially fish eggs and larvae), and in which the water transports and either concentrates or, perhaps more often, disperses ;

(2) those where the biota is active and, although undoubtedly it is in some measure transported, its own movements are substantially influenced (rheotaxis) by the flow of the water.

Several studies have been made of the effects of currents in transporting fish eggs and larvae (Hensen and Apstein 1897 ; Buchanan-Wollaston, 1915, 1923, 1926 ; Sette 1943) and it is such work which has afforded the biological basis to the argument of Carruthers *et al* (*loc. cit.*). Unquestionably the spawning habits of the fish species concerned are in some measure adapted to the circumstances of these water movements and the effect of the water movement varies according to whether it transports the eggs and larvae to or away from conditions favorable in respect of physico-chemical, nutritional and other features and in this way determines the survival of the spawn and thus the subsequent abundance of the species. Similar observations could of course be made on biota other than commercially valuable fish species and in particular of phyto-plankton in relation to nutrients, and of zooplankton in relation to food supply. Numerous studies have been made on the influence of currents upon the migrations of fish ; in such cases the effect is on distribution (thus on their accessi-

bility to fishing operations) and not on their abundance although, of course, the result may be considerable variation in local abundance from year to year.

Consideration has been given to the effect of surface water movement on the survival of fish eggs and larvae ; Dannevig and Sivertsen (1933) have examined the possibility of extremes of turbulence, due to storms, causing mortality among fish eggs and larvae.

The distribution of physical (temperature, density, transparency) and chemical (salinity, dissolved salts, dissolved gases) properties within bodies of water is intimately related to the behavior of climatic elements. It is not proposed to attempt here any analysis of these relations : it will be sufficient to note them and to say that studies of biota are often greatly aided by a reference to the climatic elements which affect the environmental elements upon which the biota are dependent.

Thus, the climatic elements play a fairly direct role in connection with variations in abundance of fish, both total abundance of a species (over its entire distribution) and local abundance, and it will be recognized that meteorological data are required for the elucidation of certain relations and will be required for, and even now in some cases are being used, in systems which will predict such variations.

Finally, there are certain direct effects of climatic elements on the biota of the hydrosphere ; notably may be mentioned the role of sunlight in the photosynthetic process, and the general role of temperature in biotic processes. It should be unnecessary to cite literature on this point since investigations of the biology of aquatic phytobiota must make reference to these environmental factors, and studies of the physiology of aquatic biota must have cognizance of the heat factor. The question then is how far the understanding of the behavior of the environmental factors at a particular situation might be improved by reference to climatic data and how far the reliability of systems predicting the behavior of the biota might be augmented by incorporation of meteorological data within the systems.

V. The Methodologies of Meteorology and Fisheries Science

The term fisheries science is employed by the Fisheries Division as signifying a synthesis of biology, economics and technology in the investigation and management of living aquatic resources and the industries by which they are exploited. In the investigation of the resources, commonly spoken of as fisheries biology, a close parallel with meteorology is demonstrable ; this parallel manifests itself in the observational techniques and patterns, and in the methods of treating, presenting and interpreting the data. But the relation is more than a parallelism in that there is common material of observation : meteorological observers make observations of surface water conditions and temperature, and oceanographers and limnologists take records of weather. Moreover, since the hydrosphere constitutes

a medium whose behavior in many ways closely resembles that of the atmosphere so that hydrodynamics and aerodynamics, as descriptive techniques, have much in common, especially in respect of the disciplines which they impose on the observational programs, there is obviously much advantage to be gained from close collaboration between workers in these two fields in the development of their theoretical sciences, and of their practical observational practices.

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BIBLIOGRAPHY

Buchanan-Wollaston, H. J. Report on the Spawning Grounds of
1915 the Plaice in the North Sea. *Fishery Investigations*, Ser. II, Vol. 2, No. 4. Ministry of Agriculture and Fisheries, London.

———. The Spawning of Plaice in the Southern Part of the North Sea
1923 in 1913-14. *Ibid*, Ser. II, Vol. 5, No. 2.

———. Plaice Egg Production in 1920-21. Treated as a statistical prob-
1926 lem with comparison between the data from 1911, 1914, and 1921. *Ibid*, Ser. II, Vol. 9, No. 2.

Carruthers, J. N., Lawford, A. L. and Veley, V. F. C. Fishery Hydro-
1951 graphy : Brood Strength Fluctuations in Various North Sea Fish, with Suggested Methods of Prediction. *Kieler Meeresforschungen* (Institut für Meereskunde an der Universität, Kiel, Germany), Vol. 8, No. 1, pp. 5-15.

———. Winds and Fish Fortunes. *Journal du Conseil* (International
1952 Council for the Exploration of the Sea, Charlottenlund, Denmark), Vol. 18, No. 3, pp. 354-58.

— and Parrish, B. B. Variations in Brood Strength in the North
1951 Sea Haddock in the Light of Relevant Wind Conditions. *Nature* (MacMillan and Co., Ltd., London), Vol. 168, pp. 317-19.

Dannevig, A. and Sivertsen, E. On the Influence of Various Physical
1933 Factors on Cod Larvae : Experiments at the Flødevig Sea-Fish Hatchery. *Journal du Conseil* (International Council for the Exploration of the Sea, Charlottenlund, Denmark), Vol. 8, No. 1, p. 90.

Graham, M. Report on the North Sea Cod. *Fishery Investigations*,
1934 Ser. II, Vol. 13, No. 4, p. 70. Ministry of Agriculture and Fisheries, London (*fide* Graham 1951).

———. Letter to the Editor — Winds and Brood Strength. *Journal*
1951 *du Conseil* (International Council for the Exploration of the Sea), Vol. 18, No. 1, No. 73.

———, Carruthers, J. N. and Goodchild, H. H. The Distribution
1926 of Pelagic Stages of the Cod in the North Sea in 1924 in Relation to the System of Currents with a Section on the Food of Pelagic Young Cod. *Fishery Investigations*, Ser. II, Vol. 8, No. 6. Ministry of Agriculture and Fisheries, London (*fide* Graham 1951).

GULLAND, J. A. Correlations on Fisheries Hydrography. *Journal du*
1952 *Conseil* (International Council for the Exploration of the Sea, Charlottenlund, Denmark), Vol. 18, No. 3, pp. 351-53.

HENSEN and APSTEIN. *Wissenschaftlichen Meeresuntersuchungen*, (Kiel,
1897 Germany). Vol. 2, No. 2, Taf. V-VII (*fide* Graham 1951).

KETCHUM, B. H. The Exchanges of Fresh and Salt Waters in Tidal
1951 Estuaries. *Journal of Marine Research* (Sears Foundation for Marine Research, Yale University, New Haven, Connecticut, U.S.A.), Vol. 10, pp. 18-38.

\- . and KEEN, D. J. The Exchanges of Fresh and Salt Waters in
1953 the Bay of Fundy and in Pasamaquoddy Bay. *Journal of the Fisheries Research Board of Canada* (Ottawa, Ontario, Canada), Vol. 10, No. 3, pp. 97-124.

ROCHFORD, D. J. Studies in Australian Estuarine Hydrology. I. Intro-
1951 ductory and Comparatory Features. *Australian Journal of Marine and Freshwater Research* (Commonwealth Scientific and Industrial Research Organisation, Melbourne, Australia), Vol. 2, No. 1, pp. 1-116.

ROSSELL, H. E. and CHAPMAN, L. B. (Editors). Principles of Naval Archi-
1947 tecture. Vol. 2, Chap. 1 : The Motion of Ships Among Waves. Society of Naval Architects and Marine Engineers, 29 West 39th St., New York, N. Y.

SETTE, O. E. Biology of the Atlantic Mackerel *Scomber scomrus* of North
1943 America. Part 1 : Early Life History. *Fishery Bulletin* No. 38. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C., U.S.A.

STEWART, J. Q. Coasts, Waves and Weather. Ginn and Co., Boston,
1945 Mass., U.S.A.

SVERDRUP, H. U., JOHNSON, M. W., and FLEMING, R. H. The Oceans.
1942 Their Physics, Chemistry, and General Biology. Prentice Hall Inc., New York, N. Y.

TRAUNG, J. O. Improving the Design of Fishing Boats. *FAO Fisheries*
1951 *Bulletin* (Food and Agriculture Organization of the United Nations, Rome, Italy), Vol. 4, No. 1/2, pp. 3-27.

T. W. Review of Carruthers, Lawford, Veley and Parrish 1951. *Journal*
1953 *du Conseil* (International Council for the Exploration of the Sea Charlottenlund, Denmark), Vol. 19, No. 1, pp. 100-102.

MARINE FISH STOCKS OF SOMALIA[1]

The stocks of marine fish in the Gulf of Aden and in the Indian Ocean, off the coast of Somalia, are of considerable interest from the point of view of the commercial fisheries development which might be accomplished by Somalia, and their relations with other stocks in the Indian Ocean.

FAO recognizes the weight of both of these considerations and therefore was glad to extend technical assistance to the Italian Administrative Authority of the Trust Territory of Somalia with the object of discovering more about the abundance and habits of the stocks, and of demonstrating, in a practical way, the methods by which these resources might best be exploited.

The following note gives a preliminary announcement of some biological observations on these stocks which were made during experimental fishing operations conducted by FAO technical assistance experts (H. Ogilvie, D. Byrd and A. Fraser-Brunner) on behalf of, and in collaboration with, the Administration of Somalia. The work was carried out in two phases : a reconnaissance survey conducted during the 1951-52 season, and a more substantial trial of fishing gear during the 1952-53 season. The work was conducted under conditions which were not always entirely favorable : a small survey vessel was lost in rough weather during passage from Aden to Bender Cassim, and weather generally was unfavorable ; the fishing season was demonstrably less profitable than seasons of recent years.

The Somali coast consists, as a moment's consideration of the map will show, of two very different sections. The first is that which lies within the Gulf of Aden, which is 130 miles long and has a very narrow continental shelf ; the second borders the Indian Ocean, is about 1,000 miles long and has a much wider continental shelf. The survey work of the FAO project has been concerned chiefly with the Gulf coast.

The biological studies centered on the tuna-like fishes, of which several occur off that coast. The most important is the yellowfin tuna (*Thunnus albacora*) which is undoubtedly of the same species as that fished extensively in the Pacific. Morphometric studies upon Pacific and Atlantic populations have revealed several " races " of this species, but up to this time no studies have been made upon those in the Indian Ocean. During the survey it was possible to take measurements of a number of specimens, which are at present being studied in relation to those of other areas, and it is hoped that some indications of their status in relation to other populations, as well as the

[1] By A. Fraser-Brunner, who carried out the biological aspects of the survey mentioned herein.

extent of individual variation and perhaps sexual differences, may be forthcoming.

The weight of these fish generally ranges from 10 to 25 lb., though larger specimens up to 50 lb. are occasionally taken. None was found to be in ripe spawning condition, and it is evident that congregations at this time are for feeding, not breeding.

The stomachs of a number of yellowfin were examined, and the vast majority of these were found to have been feeding on the porcupine fish (*Diodon maculifer*). This was surprising because very sharp, long erectile spines, which stand up on the body when it is inflated to form a ball, would appear to make this an undesirable food. In several cases when tunas were opened, the spines of the *Diodon* could be seen projecting through the wall of the distended stomach. Yet the tunas were often gorged with them.

The predominance of this species in the stomachs of the tuna suggests that the latter were feeding near the bottom, for *Diodon* is essentially a bottom living fish. Sometimes a number of porcupine fish might be observed floating, inflated and helpless, at the surface, having been driven up from below. This was the only indication that the schools of yellowfin might be in the deeper water. Exploration with the longline in the region of the thermocline, which is thought to afford optimum conditions for this species, failed to locate school fish.

Yellowfin were found in any quantity only at one place. This was at Abo, towards Cape Guardafui, where a cannery is situated. Here a submerged hill brings the bottom, with its population of *Diodon*, into the level of the thermocline (at about 40 fathoms) and so within reach of the hand line fishermen.

As a contribution to understanding the relations between the conditions in the area, and the presence or absence of fish, a number of water samples and various hydrological observations were obtained during the latter part of the survey, when a new winch and wire became available. The plankton was also studied, as far as possible, throughout the period, and comparative studies of this are in progress.

A second species of tuna (*Thunnus tonggol*) is also found in the area. This is called Zeinūb locally, but we have coined the English name long-tailed tuna, as it is at once distinguishable from all others of the genus by the long, narrow caudal portion of the body, behind the dorsal fin. Apart from its slender form, it is very similar in appearance to yellowfin, though there are several internal differences. This species is quite edible, and is sometimes canned, but it does not make quite such a good pack as yellowfin. It is generally found in shallower water and nearer the surface than yellowfin, and feeds mainly on sardine-like fishes, small Carangids and so on.

By far the commonest Scombroid fish, however, and the most easily caught, is the Shirwa, or Eastern Little Tunny (*Euthynnus affinis*), which was obtained in considerable numbers on multiple-trolling gear. Unfortunately, it has dark coarse flesh and does not at present make a good pack.

Skipjack (*Euthynnus pelamis*), bonito (*Sarda orientalis*) and frigate-mackerel (*Auxis thazard*) are also taken in small numbers.

A few chub-mackerel (*Scomber japonicus*) were obtained among sardines and small jack in the lampara net, but the common mackerel of the Gulf is *Rastrelliger canagurta*, often seen breaking the water in broad shimmering schools; it is not greatly valued at present.

One of the finest food fishes of the coast is the Turnak, or King-fish (*Scomberomorus commerson*), a powerful and voracious species which is captured mainly by trolling, often very close inshore. It may reach a length of 4 feet and a weight of 65 lb. Wherever the shore forms a shallow sandy area this fish is to be found; it seems to be as frequent at Mogadiscio and southward as on the northern coast.

One other interesting Scombroid has been found on the Somali coast. During the reconnaissance a species of *Scomberomorus* which at once appeared different from anything seen before was caught. On investigation the writer found that according to the most recent opinion it should be *S. guttatus*, a common Indian species; however, the writer is familiar with the latter, and believes it to be different. Two other nominal species have been synonymized with *S. guttatus*, and it may prove to be one of these; or it may be quite new. Unfortunately, at that time it was impossible to collect the specimen and only drawings and photographs were obtained, but during the second season two more were caught and preserved.

Next to the Scombroids, the fishes used as bait are most in need of study. The fishermen use "sardines" a name covering a number of species, including a kind of anchovy (*Thrissocles baelama*), two species of *Harengula*, four species of *Sardinella*, and sometimes even the Percoid fish *Sillago*. Of these the best is undoubtedly the 'Eid (*Sardinella longiceps*) which is distinguishable at a glance by noting the proportions of the head. Schools of this fish are nearly always accompanied by the little Carangid fish, called locally Gadab (*Selar crumenophthalmus*), and there are interesting resemblances between their feeding habits. The Gadab is also an esteemed bait fish, especially by line fishermen, who find it tough enough to remain on the hook and be fairly attractive to the tuna. One general conclusion that seems to be suggested by observations in the two seasons is that the *Sardinella* species move inshore to breed, whereas the Gadab do not. Larger Carangids, collectively known as Jack (*Caranx caranyus*, *C. sansun*, *C. ignobilis*, etc.) also figure largely among the fishes to be taken by trolling.

The results of this project will be examined in detail in a report to the Government of Somalia.

A. Fraser-Brunner

Conferences and Meetings

International Fishing Boat Congress

A tentative list of papers to be presented at FAO's International Fishing Boat Congress appears on pp. 131-135.

International Council for the Exploration of the Sea (ICES)

The 41st meeting of the Council will be held in Copenhagen, Denmark, from 28 September to 6 October 1953.

It has been announced that there will be papers read and a discussion on fish detection (acoustically and optically), at the meeting of the Pelagic Committee, under the chairmanship of Arni Fridriksson.

Further information may be obtained from the General Secretary, Charlottenlund, Denmark.

Gulf and Caribbean Fisheries Institute

The Sixth Annual Session of the Institute will be held from 16 to 20 November 1953 at Miami Beach, Florida, U.S.A., simultaneously with FAO's International Fishing Boat Congress, and meetings of the Southeastern Fisheries Association, and the Shrimp Association of the Americas. The International Fishing Boat Congress will hold a joint session with the Institute on 16 November ; during the other four days the two groups will have concurrent meetings. The Southeastern Fisheries Association, made up of Florida and other southern producers, and the Shrimp Association of the Americas, consisting of Mexican, Texan and other shrimp producers, will each hold a one day meeting during the week.

The program of the Institute meeting will include sessions on technology, economics, biology and industry. The Economic Session will take the form of a round-table discussion on financing fishing vessels. The Biological Session will pose the important question, " What are the concrete accomplishments of fishery biology during the past fifty years, and what direction should this research take in the future ? "

Additional information about the meeting can be had from C. P. Idyll, Executive Secretary, Gulf and Caribbean Fisheries Institute, University of Miami Marine Laboratory, Coral Gables (University Branch), Florida, U.S.A.

International Union of Biological Sciences

The Eleventh General Assembly of the Union will be held in Nice, France, 18-21 August 1953. Secretary of the Union is Prof. P. Vayssière, Muséum National d'Histoire Naturelle, 57 rue Cuvier, Paris 5.

Of the Union's constituent associations, the following will be meeting shortly: International Congress of Zoology, Copenhagen, Denmark, 5-12 August 1953 (*see FAO Fisheries Bulletin*, Vol. 6, No. 1/2, pp. 37-38); International Association of Limnology, Cambridge, England, 20-30 August 1953 (*see* Vol. 6, No. 3, pp. 90-91); International Congress for Microbiology, Rome, Italy, 6-12 September 1953 (*see* below); International Congress of Biometry, Bellagio, Italy, 1-5 September 1953.

VIth International Congress for Microbiology

This Congress, which will take place in Rome, Italy, from 6 to 12 September 1953, will be organized in plenary sessions, scientific sessions, symposia, and meetings of the special committees of the International Association of Microbiologists. The Scientific Session will include the work of 22 sections, some of which are divided into sub-sections. Section 22 is concerned with marine microbiology and its chairman is K. R. Butlin, of England. Fisheries technologists have special interest in Section 20, dealing with microbiology applied to hygiene, and Section 21 dealing with microbiology of milk and foodstuffs. The presence of fisheries technologists at this meeting will afford an opportunity to hold a meeting of a working group concerned with chilling of fish of the Interim Committee on Fish Handling and Processing in Northwestern Europe, and an organizational meeting for another working group which will be concerned with freshness tests.

Permanent Commission on Overfishing

The first meeting of this Commission set up under the Overfishing Convention of 1946 to prevent depletion of fish stocks in the North Sea and other areas was held in London on 5 May 1953. The Convention came into force on 5 April 1953 with its ratification by Spain. The Permanent Commission was established at a meeting of representatives of the signatory governments held in London, 4-5 March 1953. The waters covered by the Convention are those of the North Sea, and of the northern seas away to Greenland, Iceland, the Faroes, Northern Norway and Bear Island.

Attending the meeting were representatives from Belgium, Denmark, France, Iceland, Eire, Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom. Poland, the other signatory government, and the Federal Republic of Germany, which has indicated

its intention of acceding to the Convention when the necessary legislation has been passed, sent observers. Discussions centered around the organizational and financial arrangements for the Commission's work, the scope of this work, and conservation problems. The Commission elected R.G.R.Wall, Fisheries Secretary for England and Wales, as president for a term of 3 years, and Gunnar Rollefsen, Director of the Marine Research Institute, Norway, as vice-president for the same term. The Commission decided to set up its office in London, as A.S. Armstrong of the Ministry of Agriculture and Fisheries was appointed Secretary.

The next meeting will be held in London in November 1953.

International Commission for the Northwest Atlantic Fisheries

The Third Annual Meeting of the Commission (ICNAF) was held at Yale University, New Haven, Connecticut, U.S.A., from 25 to 30 May 1953. Dr. John L. Kask, Chairman, presided over the sessions. Executive Secretary of the Commission is Dr. Erik M. Poulsen. The Commission's statistician is J. Côté. The following representatives attended :

Canada	S. Bates, L. Bradbury, J. H. MacKichan, A.W.H. Needler, W. Templeman.
Denmark	N. Bjerregaard, B. Dinesen, K. Djurhuus, P. M. Hansen, Dr. Å. V. Tåning.
France	A. Alloy, Comm. H. F. Barbier, Jacques Ancellin, F. Le Gasse, Quebriac, St. Etienne.
Iceland	Unsteinn Stefansson.
Italy	Clemente Boniver, Alberto Cupelli.
Norway	B. Rasmussen, G. Rollefsen, K. Sunnanaa.
Portugal	Comm. T. de Almeida, J. M. Figueiredo.
Spain	Vice-Admiral F. Menéndez Bojard, P. D. de Espada, G. Masó, C. Ojeda, V. Trelles.
United Kingdom	A.T.A. Dobson, C.E. Lucas, R. S. Wimpenny.
United States	J. Clark, J. Colton, H. W. Graham, Dr. J. L. Kask, G. Kelly, B. Knollenberg, F. W. Sargent, C. Taylor, W. M. Terry, L. A. Walford.

A.T.A. Dobson and Å.V. Tåning acted as observers for the International Council for the Exploration of the Sea.

H. Winsor attended as an observer for FAO.

The Commission disposed of an extensive agenda of administrative matters, including questions relating *inter alia* to finance, to the Commission's permanent headquarters, and to its publications. On the question of headquarters the Commission decided to select Halifax, Nova Scotia, Canada, for the site.

The Commission's technical work is conducted through meetings of a series of panels and of a Committee on Research and Statistics which prepare material for consideration by the Commission as a

whole. On the recommendation of a special committee on the Commission's research program (report from which was received at this meeting) the Commission approved the appointment of three working parties, responsible to the Committee on Research and Statistics, to be concerned with cod and haddock, redfish and halibut, and hydrography.

The Commission adopted recommendations, submitted by the Panels and the Committee on Research and Statistics, dealing with the furnishing of statistics by Member Governments, the conduct of research in biology and hydrography, and on the regulation of the fisheries in Sub-area 5. The proposals on statistics were :

A. that all contracting governments be requested to make those observations on the changes in weight of fish from the fresh round state to the various processed states which seem, in consultation with the Commission's statistician, to be necessary to obtain accurate statistics ;

B. that the contracting governments be requested to submit statistics in terms of fish in the state in which they are first weighed and to provide the Commission with the conversion factors necessary to calculate the fresh round weights ;

C. that, in view of the usefulness of such information, the participating governments report statistics of landings to the Commission according to commercial size categories already in use by the industry and report annually the definition of such categories of fish sizes ;

D. that the participating governments be requested to report in summary form information on the numbers of vessels of various types and sizes fishing in the Convention Area during each year and that, to provide the basis for classification of fishing vessels, each government report the name, gross tonnage, horsepower and type of fishing gear for each vessel fishing in the Convention Area in 1953 ;

E. that the request for statistics on landings and fishing effort in prescribed form as made by the Commission's statistician on 1 October 1952 be approved in principle as a basis for future requests ;

F. that, in order to provide indices of relative abundance, the Commission Secretariat be requested to arrange for the collection of more refined fishing effort data for representative types of vessels and methods of fishing ;

G. that the participating governments be requested to compile their statistics of catches and fishing effort on a monthly basis ;

H. that, in order to provide the Commission with up-to-date information, each participating government be urged to report, at least one month before the next annual meet-

ing, statistics on its landings of each species from each sub-area, together with such other statistical information as is then available.

It was found necessary to defer, for the time being, action on the development of a standard unit of fishing effort.

In respect of its research program the Commission adopted the report of the special committee appointed to consider this program, which generally reviewed the field of work, the existing research equipment and activities in the area, and the means by which the work required by the Commission's objects might be carried out. The Commission adopted the following recommendations from the Committee on Research and Statistics relating to the details of the program :

1. that the statistical subdivisions of sub-areas recommended by the sub-committee, amended to include in Subdivision F all of Sub-area 1 south of Subdivision E, and with Subdivisions I to O re-lettered as Subdivisions J to P, respectively, become effective 1 January 1954 and be regarded as permanent insofar as possible ;

2. the following instructions for sampling in cod investigations be approved :
   (*a*) measurements should be taken in centimeters ;
   (*b*) fish should be measured from the snout to the end of the tail ;
   (*c*) when taking samples otoliths and scales should also be collected if convenient ; such data as sex and maturity would also be valuable ;
   (*d*) regarding the size and number of the samples with otoliths from one particular fishing area it would be better to collect a number of small samples (for instance 100 individuals) than one or two larger samples ; it may be regarded sufficient when the total sample from one particular fishing area and fishing season consists of about 1,000 individual fish ;
   (*e*) samples should be random and include all sizes caught and not merely the commercial sizes ;

3. participating governments take responsiblity for the collection of tags taken by their fishermen, with information concerning the recaptures ; for the payment of rewards for these tags ; and for the exchange of full information concerning each tagging ;

4. that the Commission instruct the Executive Secretary to prepare and distribute posters, in each language used by the member nations, with illustrations of the types of marks used, a statement concerning the purpose of tagging, a request for specific information about each recapture, and details of the reward ;

5. that further research on cod in Sub-area 1 proceed mainly on three lines :
   (*a*) relation to temperature,
   (*b*) identity of stocks, and
   (*c*) correct measurement of mortality.

6. regarding redfish research :
   (*a*) length should be measured from the tip of the lower jaw, with mouth closed, to the end of the tail at the mid-fork ;
   (*b*) measurement should be in centimeters ;
   (*c*) when taking samples for growth and year class strength, one should collect otoliths and information on length, sex and maturity ; information on parasitism and stage of maturity is also desirable ;
   (*d*) in view of the presumed considerable age of redfish, the total yearly sample from an area should be large and composed of a number of small samples ;
   (*e*) additional measurements of redfish, both caught and landed, are very valuable ; these measured fish should be sexed wherever possible ;
   (*f*) since there is some doubt about the species and races of redfish represented in the North Atlantic, it is recommended that there be considerable investigation of racial and specific matters wherever redfish can be collected ;
   (*g*) the interpretation of scales and otoliths of Atlantic redfish is so uncertain that it is very important that the method of age determination be developed and rigorously tested. (During this experimental period the maximum interchange of otoliths and scales for age determinations should be encouraged between all laboratories concerned. Meanwhile the more experienced workers are requested to be preparing for the Committee on Research and Statistics a rigorous inter-laboratory system of age determination in which laboratories outside the Commission's area should be invited to collaborate) ;
   (*h*) the horizontal and vertical extent of redfish stocks should be explored ;
   (*i*) there is insufficient evidence regarding migration of redfish and all possible measures to determine migration should be carried out.

7. the draft program of hydrographic research drawn up by the Hydrographic Sub-Committee at the Second Annual Meeting of the Commission should be adopted as a satisfactory minimum for the present. Further, participating governments are requested to make available to the Com-

mission, as soon as possible, the appropriate temperature, salinity sections with brief reports on them ;

8. that, since the Commission's hydrographic problems are not circumscribed by the Commission's area boundaries, consideration must be given in the Commission's research programs to the water movements :

   (*a*) to the east of Greenland,
   (*b*) to the west of Ireland, and
   (*c*) through the Florida Straits ;

9. that the European countries, and the United Kingdom in particular, be requested to undertake a section approximately from the southwest of Ireland to a position about 51° N. Lat., 31 W. Long., to a depth of 1,600 feet and in some stations to at least 3,300 feet ;

10. that during their travels members of the Secretariat be asked to discuss with the various countries how best to avoid unnecessary duplication of hydrographic effort.

The Commission also decided that the standing Sub-Committee on Hydrography be composed of both biological and hydrographical oceanographers and that this sub-committee be asked :

(*i*) to appoint some person to explore the possibilities of using trans-Atlantic craft and weather ships in securing hydrographic data,
(*ii*) how the Commission can make use for fisheries purposes of the meteorological and hydrographic information available from the North Atlantic and how it can best collaborate with other bodies so as better to understand the forces leading to temperature and other changes with a view to predicting them, and
(*iii*) whether the Commission's hydrographic needs can best be met by the appointment to the staff of a hydrographer, or by other means.

In respect of fisheries management. the Commission resolved:

"...that the Contracting Governments take appropriate action to prohibit the taking of haddock (*Melanogrammus aeglefinus*) in Sub-area 5 by persons under their jurisdiction with a trawl net having a mesh size less than four and one-half inches when measured wet after use, or having a mesh size when measured dry before use less than the equivalent of four and one-half inches wet measurement after use. For the purpose of this proposal, the four and one-half inch mesh size when measured wet after use shall be taken to be :

(*a*) in the cod end of the net, the average of the measurements of each mesh in any series of fifty consecutive meshes running parallel to the long axis of the cod end and beginning at the after end of the cod end, such series to be at least ten meshes from the lacings and to be measured with a

flat, wedge-shaped gauge having a taper of two inches in nine inches and a thickness of three thirty-seconds of an inch, inserted into the meshes under a pressure of not less than ten nor more than fifteen pounds, and

(*b*) in any part of the net other than the cod-end, the average of the measurements of each mesh in any series of twenty consecutive meshes, such series to be at least ten meshes from the lacings and to be measured with a flat, wedge shaped gauge having a taper of two inches in nine inches and a thickness of three thirty-seconds of an inch, inserted into the meshes under a pressure of not less than ten nor more than fifteen pounds. ''

This recommendation is an amendment to the methods of mesh measurements stated in the Commission's proposal for haddock regulations in Sub-area 5, passed at the Annual Meeting in July 1953. These regulations are now in force in the area concerned.

Canada's Deputy Minister of Fisheries, Stewart Bates, was elected the new Chairman of the ICNAF, and Comm. T. de Almeida, of Portugal, the vice-chairman.

Fisheries Division Activities

FAO Conference

The Conference, the governing body of FAO, will hold its seventh session in Rome from 23 November to 13 December 1953. At the meeting, the work of the Fisheries Division in 1952/53 and its program for 1954/55 will be discussed in detail and in a special fisheries panel; it is hoped that many fisheries representatives will be present. A special feature of this session of the Conference will be the presentation by the Secretariat of a paper forwarding suggestions on the many problems which must be met if the fisheries industries are to contribute substantially more than they now do to the world food supplies. The many unused aquatic resources, which are often near important population centers are a challenge to the fisheries industries and to government administrators. The purpose of the paper is to point to some aspects of the problems which call for individual and concerted action if a substantial increase in fish production is to become a reality.

Prior to the FAO Conference a certain number of preparatory meetings, known generally as "pre-conference regional meetings," are held to review the current food and agricultural situation on a regional basis, to appraise the targets, to forward estimates of production, consumption and trade for the next two-year period, and to consider the work of FAO in the region. This year regional meetings will be held in the Far East and the Near East.

The last pre-conference meeting for the Near East was held in Bloudane, Syria, in August-September 1951, prior to the 6th Session of the Conference of FAO. This year the Egyptian Government has generously offered to act as host and a similar meeting is to be opened on 1 September in Cairo. As the fisheries industry plays only a small part in the economy of the region and national agencies in charge of fisheries have generally a fairly simplified set-up and are sometimes even non-existent, it is unlikely that the meeting will be attended by fisheries experts. Therefore, the Fisheries Division has considered that it would be of interest to call the attention of the participants to the problems of fisheries development. For that purpose M. J. Girard, Regional Fisheries Officer for the Near East, has prepared a paper considering the important role falling on governmental fisheries agencies in the planning and carrying out of fisheries development plans. This paper stresses also that fisheries development problems in the Near East must be approached in the light of the general level of economic and industrial development of the region and that simple and progressive improvements of the present situation are to be pre-

ferred to any attempt to introduce highly mechanized and improved techniques.

The regional meeting for Asia and the Far East will be held through the courtesy of the Government of India in Bangalore from 27 July to 5 August 1953.

L. P. D. Gertenbach has prepared a contribution on fisheries to be incorporated in a general paper by the Secretariat. The fisheries section consists of a brief statement on the present situation in production and in external trade in fisheries commodities of the region, and fisheries development programs now under way or being planned by the various governments with or without assistance from international and other outside sources. Development of safe anchorages, harbors, market facilities, the mechanization and improvement of fishing craft and gear, improved processing and handling techniques, the development of pond fish culture and other inland fisheries activities are reviewed. The necessity of establishing adequate administrative units within the government to serve as focal points for conducting social, economic and technological research, appraisal of resources and enforcement of regulations is stressed. In addition, it is stated that top priority should be given, in some instances, to the development of marketing to ensure the economic disposal and full utilization of the catches now being expanded by the improved fishing potential. It also points out the necessity of ensuring a sound organizational basis with proper emphasis on fish marketing and fisheries development.

International Fishing Boat Congress

To date, 160 persons have registered for the Paris session of this Congress to be held from 12 to 16 October 1953 and 60 for the Miami session to be held from 16 to 20 November 1953. Jan-Olof Traung of FAO will serve as Secretary of both meetings and will be glad to answer any enquiries regarding the program, registrations and other details.

The following papers have been agreed upon for presentation at both sessions; still others are under negotiation. This list is therefore by no means final. Papers are being preprinted as soon as possible after receipt for distribution prior to the Congress.

G. M. Gerhardsen, Chief Fisheries Economist, FAO, Rome, Italy	"Economical Size of Craft under Varying Conditions"
Basil Parkes, Managing Director St. Andrews Steam Fishing Co., Ltd., Hull, England	"The Owner's Viewpoint"

A. N. Christensen, Manager, Ancas Traeskibsbyggeri, Prinsensgate 2, Oslo, Norway	"Costings as a Means of Rationalizing Fishing Boat Construction"
R. F. Allan. Naval Architect. Vancouver, B.C. Canada	"The Design and Construction of British Columbia Fishing Vessels"
J. Boot, Managing Director, Boot Shipyard, Woubrugge, The Netherlands	"Dutch Lugger Trawlers"
R. E. Gueroult, Naval Architect, 47 rue de Maubeuge, Paris 9	"French Deep Sea Trawlers"
John Tyrrell, John Tyrrell and Sons, Arklow, Co. Wicklow, Eire	"Modern Irish Fishing Boats"
Hans K. Zimmer, Naval Architect, Bergen, Norway	"Beach Landing Craft used for Fishing in Europe"
Howard I. Chapelle, Naval Architect, Cambridge, Md., U.S.A.	"Some American Fishing Launches"
H. C. Hanson, Naval Architect, Seattle, Wash., U.S.A.	"Pacific Coast Fishing Boat Types"
James F. Petrich, Naval Architect, Western Boat Building Co., Tacoma, Wash., U.S.A.	"The Influence of Operational Factors on the Design of a Modern Tuna Clipper"
Dwight S. Simpson, Naval Architect, Newton, Mass., U.S.A.	"The Development of the New England Trawler"
M. R. Qureshi, Director, Central Fisheries Dept., Karachi, Pakistan H. Magnusson, Naval Architect, Göteborg, Sweden	"Pakistan Fishing Craft"

Francis Minot, Maritime Consultant, Director, Marine and Fisheries Engineering Research Institute, Inc., Woods Hole, Mass. U.S.A.	"The Oceanographic Research Vessel"
G. L. Kesteven, Chief Marine Biologist, FAO, Rome, Italy	"Sea-Going Vessels for Fisheries Research and Development (definitions and catalogue)"
Prof. W. P. A. van Lammeren, Superintendent, Wageningen Model Basin, Wageningen, Netherlands	"Tank Testing Technique"
J. O. Traung, Naval Architect, FAO, Rome, Italy	"Catalogue of Fishing Boat Tank Tests"
George Nickum, Naval Architect, W. C. Nickum and Sons, Seattle, Wash., U.S.A.	"Stability of Fishing Vessels"
W. McInnis, Naval Architect, Eldredge-McInnis Inc., 131 State St., Boston 9, Mass., U.S.A.	"Loading, Change of Trim on Trawlers"
W. C. Gould, Manager, New York Marine Sales Office, Detroit Diesel Engine Division, General Motors Corporation, New York	"High Speed Diesels as Utilized by the Fishing Industries"
D. L. Brownlow Technical Director, Mirrlees, Bickerton & Day, Ltd., Stockport, England	"The Use of Medium Speed Diesels on Board Fishing Vessels"
R. G. Andersen, Manager, A/S Tuxham, Copenhagen, Denmark	"Heavy Duty Fishing Engines"
Paul Ziener, Naval Architect, Valparaiso, Chile	"Some Aspects of the Motorization of Fishing Craft in Chile"

S. R. Setna, Director of Fisheries, Bombay, India	"Bombay Fishermen Forge Ahead"
Wm. C. Miller, Marine and Aviation Surveyor, San Diego, Cal., U.S.A.	"Safety at Sea"
J. G. de Wit, Shipbuilding Expert, Shipping Inspection Service, Scheveningen, Netherlands	"Safety at Sea for Fishing Boats under Netherlands Acts and Regulations"
C. B. Carlson, Chief, Gear Development and Research Program, U.S. Fish and Wildlife Service, University of Miami Marine Laboratory, Coral Gables, Fla., U.S.A.	"Recent Developments in Fishing Vessel Deck Gear" "Fishing Vessel Live Bait Equipment"
Hans Vestre Huse, Technical Director, Brattvaag, Norway	"Hydraulic Deck Equipment"
D. B. Cunningham, Naval Architect, General Manager, Brooke Marine Ltd., Lowestoft, England	"Deep Freeze Factory Ships"
C. G. P. Oldershaw, Refrigeration Engineer, Fishery Technological Laboratory, East Boston, Mass., U.S.A.	"The Experimental Freezing Trawler *Delaware*"
J. A. van Aken, Head of Propeller-Design Department, Lips Propeller Works, Drunen, Netherlands	"Fixed Blade and Controllable Pitch Propellers for Fishing Boats"
D.W. Dickie, Naval Architect and Marine Engineer, Oakland, Calif. U.S.A.	"Calculating the Stability of Tuna Clippers"

José M. González-Llanos y Carencho, Marine Engineer, El Ferrol del Caudillo, Spain	"Buques de Pesca Españoles" [Spanish Fishing Boats]
N. Hoeckel Hamburgsche Schiffbauversuchanstalt. Hamburg, Germany	"Seaworthiness and Safety of Trawlers in a Seaway"
H.E. Jaeger, Professor of Marine Construction, Ecole supérieur polytechnique de Delft, Delft, Netherlands	"Quelques notes sur les grandes chalutiers" [Notes on Deep Sea Trawlers]
Robert Kolbeck, Director, Maschinenfabrik Augsburg-Nürnberg, A.G., Augsburg, Germany	"Vater-und Sohn Motorenanlagen (Schwerölmaschinen)" [Father and Son Engine Plants]
Kurt Schmidt and Theodor Schumacher, Klöckner-Humboldt-Deutz A.G. Cologne, Germany	"Neuzeitliche Antriebsanlagen für Fischereifahrzeuge mit Motoren" [Modern Propulsion Plants for Fishing Vessels]
H. Kannt, A.G. "Weser" Werk Seebeck, Bremerhaven, Germany	"Fischereifahrzeuge der Gegenwart" [Fishing Vessels of Today]
P. Stoffel, Escher Wyss Maschinen GmbH., Ravensburg, Germany	"Verstellpropeller" [Controllable Pitch Propeller]

FAO Interim Committee on Fish Handling and Processing

The Interim Committee was established to further the stimulation and co-ordination of research in the field of fish handling and processing. Its main area of activity is Europe, but persons from other parts of the world are frequently invited to participate in specific aspects of the work.

The establishment of the Committee should be viewed in the light of FAO's general policy to set up fisheries councils or similar

bodies to provide machinery for the co-operation of fisheries workers in the various regions of the world. Already established are the FAO Indo-Pacific Fisheries Council (IPFC) and the FAO General Fisheries Council for the Mediterranean (GFCM). An FAO fisheries council for Latin America is well under way. These councils aim at the co-ordination of fisheries work in biology, technology and economics. In the north-western European area effective co-operation has long been in existence in fisheries biology, within the framework of the International Council for the Exploration of the Sea (ICES), but no similar organization existed in the field of fisheries products technology. It was for this reason that FAO took steps to establish the Interim Committee on Fish Handling and Processing.

The Interim Committee which has been active since 1951 is composed of Dr. G.A. Reay (Scotland) chairman : Eirik Heen (Norway), Jean le Gall (France), members ; and Ernest Hess (FAO), Secretary. It works through contact persons, correspondents and working groups. Four working groups have been established and a fifth is under consideration.

Working Group on Fishery Products for Tropical Consumption

This Group studies the possibilities of manufacturing inexpensive fisheries products acceptable to protein-needy population groups. It held its first meeting on 29 and 30 May, 1953, in the Humber Laboratory, Hull, England. In attendance were :

K. Bakken, Directorate of Fisheries, Chemical Technical Research Institute, Bergen, Norway.

A. Mck. Bannermann, Humber Laboratory, Hull, England.

Miss K. Beck-Slinn, Torry Research Station, Aberdeen, Scotland.

Dr. F. E. Byron, School of Hygiene and Tropical Medicines, London, England.

S. Einarsson, Faxi Ltd., Reykjavik, Iceland.

Y. C. Gilberg, Directorate of Fisheries, Chemical Technical Research Institute, Bergen, Norway.

Dr. E. J. Hamley, Part-time Secretary to the Chairman of the FAO Working Group, London, England.

Dr. C. F. Hickling, Colonial Office, London, England.

Mogens Jul, Technology Branch, Fisheries Division, FAO, Rome, Italy.

Dr. G. L. Kesteven, Marine Fisheries Section, Fisheries Division, FAO, Rome, Italy.

Mogens Kondrup, Nutrition Division, FAO, Rome, Italy.

J. van Mameren, Central Institute for Nutrition Research T.N.O., Utrecht, The Netherlands.

Dr. J. Olley, Torry Research Station, Aberdeen, Scotland.

H. Petersen, Technological Laboratory, Danish Ministry of Fisheries, Copenhagen, Denmark.

Dr. J. M. Shewan, Torry Research Station, Aberdeen, Scotland.

T. Sparre, Herring Oil and Herring Meal Research Institute, Bergen, Norway.

Dr. C. L. Cutting, Chairman of the Group, was unable to attend because of illness, and for the same reason was compelled to resign as chairman. Dr. J. M. Shewan presided over the meeting in his absence and Mogens Kondrup, of the Nutrition Division of FAO, agreed to serve as acting Secretary. Invitations to become members were extended to Dr. Hickling, Dr. Byron and J. van Mameren.

A report was given on the work of the group.

A summary report of information collected by the chairman regarding possibilities for marketing herring and similar products in various areas of Africa, Asia and Latin America was presented and will be distributed for consideration and comment by members of the Group and of the staff of FAO. The Working Group members, as well as FAO, had provided many samples of native products from Africa and Thailand and of such products as edible fish flours, fish sauces, and refined fish solubles, which were on display during the meeting. The Group felt that some of the products, particularly edible fish flours, some type of bonga, and fish sauces might be suitable for marketing in the areas considered. The Humber Laboratory and possibly the Technical Chemical Institute of the Norwegian Directorate of Fisheries will make storage tests of bonga while M. Kondrup will try to arrange for storage tests of edible fish flours. With regard to the latter, FAO is trying to select those flours which might be used for acceptability tests in Latin America and the Far East and Dr. Byron will undertake a similar selection for Africa. Dr. Hickling will assist the Group in arranging for acceptability tests for bonga and edible fish flours in Africa and FAO will attempt to arrange for tests for edible fish flours in Latin America and the Far East. As to the question of prices, the Humber Laboratory and the Technical Chemical Institute of the Norwegian Directorate of Fisheries will undertake calculations as to the prices for which bonga may be delivered in Africa and Dr. Hickling will get information on prices for which fish sauces and meat extracts sell in the Far East.

With regard to fermented fish sauces, it was thought that the best possibility would be to arrange for their manufacture in the Far East from either fish meal or fish solubles. FAO will assist in making arrangements for some of the samples of such sauces prepared in Norway to be sent to the Far East for comments. After receiving these comments, the Norwegian Technical Chemical Institute might make preliminary tests as to how fish meal or fish solubles might be used in the manufacture of fermented sauces. FAO will arrange the sending of samples of fish sauces from the Far East to Norway for use in these

tests. After the preliminary tests have been made, FAO will try to make arrangements for laboratories in the Far East to undertake research to work out manufacturing methods.

Dr. Byron and FAO staff members will evaluate the samples supplied by members of the Working Group and will contact members with regard to supplying larger samples for inclusion in experiments or acceptability tests.

Working Group on Chilling of Fish

It is known that chilling of fish to a temperature very close to freezing has advantages over ordinary icing or cooler storage practices. Tests of methods for the practical application of the principle are desirable. Studies of chilling practices are also needed with regard to handling aboard, ashore and during shipment. A survey of various types of ice, etc., is planned. The Group is preparing a report summarizing the present knowledge in the field to be considered at a meeting to be held in Rome on 14 September 1953.

Working Group on Pre-packaged Fishery Products

This Group studies modern consumer size packages of fisheries products that are not frozen or canned. Special topics for research will be packaging methods and materials, chemical preservatives, antioxidants, etc. Public health and legal aspects will be considered, also.

Working Group on Freezing of Fish in Bulk

The freezing of fish in consumer-size packages has been well studied. There is, however, a need for inexpensive freezing methods to be used ashore or aboard, for preserving prior to canning, smoking, freezing in consumer-size packages, or even sale on the fresh fish market ; this is the aim of this Group.

Working Group on Objective Freshness Tests

A meeting will be held in Rome, 6-7 September 1953, to consider the possibilities of establishing a Working Group on Objective Freshness Tests. It has been provisionally proposed that the group study the feasibility of using standardized objective tests in judging the quality of fish and endeavor to select the most suitable tests and establish standards for various species. The co-operative experiment should be limited in scope to preferably one species at a time, to preferably one simple chemical test or two at the most, to possibly one bacteriological test in addition and to organoleptic tests including examination by professional fresh fish inspectors and by testing panels using a scor-

ing system. All tests would have to be standardized and agreed to as a preliminary step, including the sampling techniques.

Statistical analysis of the results by the working group would serve as a basis for proposals of standards, which may vary for different species.

General Fisheries Council for the Mediterranean (GFCM)

The Executive Committee of the GFCM met in Rome, 8-10 June 1953. The first vice-chairman, Christos Serbetis, of Greece, presided over the meeting in the absence of the chairman, Prof. Jean le Gall, of France. The Committee reviewed the administrative work of the Council and discussed its future activities. At its first meeting, the Council recommended that study groups, composed of competent persons nominated by the Government, be formed in each country to look into certain questions and advise the Council's technical committees of the results as well as to call the attention of the technical committees to questions to which preference should be given for joint study. The Committee noted that the nomination of study groups is at present under way in Italy, Greece and Yugoslavia.

Further discussions were held regarding the proposal to hold a Fish Culture Information Center in Israel in the spring of 1954 under the FAO Expanded Technical Assistance Program. The Committee recommended that, in view of its potential importance in the area, attention be given also to trout culture at the Center.

The Committee approved the following agenda for the next meeting of the Council to be held in Rome, 26-29 October 1953 :

1. Report on credentials
2. Adoption of the agenda
3. Statements by delegations
4. Report of the Executive Committee
5. Report of the Secretariat
6. Membership and liaison
7. Activity and report of the Technical Committee on Exploration
8. Activity and report of the Technical Committee on Production
9. Activity and report of the Technical Committee on Utilization
10. Publications
11. Technical committees and working groups
12. Review of the Program of Work
13. Budget
14. Election of the chairman and vice-chairman
15. Time and place of next meeting
16. Other business.

Many technical papers are expected to be presented at this meeting which will constitute the first working meeting of the Council.

The Executive Committee will meet in Rome immediately before and after the plenary meeting of the GFCM, i.e., 23-24 October and 30-31 October 1953.

Regional Fisheries Office for Latin America

As the first of a series of trips to obtain first hand information on Chilean fisheries and to assist the Government directly on local projects to promote the use of marine living resources, the Regional Fisheries Officer, Dr. B. F. Osorio-Tafall, visited the Concepción-Talcahuano area in southern Chile, 4-9 May 1953. During his stay in this part of the country he established contact with the staff of the University of Concepción where he delivered two lectures, one on "Organic Productivity of the Ocean and the Investigation of the Chilean Sea" and the other on "Population and Natural Resources." He visited the proposed site of the marine biological station and discussed plans for the station with members of the university staff. Other visits included one to Talcahuano to examine the site of the fish terminal and to discuss its plans with the engineers in charge of the project, to the fisheries school in San Vicente, and to the university farm.

In connection with the campaign to increase fish consumption in Chile, Dr. Osorio-Tafall gave a radio talk on 3 May 1953, on "The Importance of Fish Consumption for the Economy of Chile and the Nutrition of its Population." On 12 May he delivered a lecture at the University of Chile on "Fisheries Resources of Chile" under the auspices of the Chilean Maritime League.

Fernando de Buen's lectures on fishes of economic importance given at the Latin American Fisheries Training Center have now been published by FAO in Santiago, Chile, under the title "Las Familias de Peces de Importancia Económica" (*see* p. 151).

Regional Fisheries Office for Asia and the Far East

Visits to Laos, Viet-Nam and Cambodia

Dr. Miles, the Regional Fisheries Officer, visited Laos, Viet-Nam and Cambodia to discuss with competent authorities the fisheries programs of these countries and the work of the IPFC.

In Laos, he discussed with Claude Vercouttre, French Technical Counsellor, and Nouthak Sithimolada, Acting Chief of the Division des Eaux et Forêts, the possibility of the Kingdom instituting a fisheries program. Much importance was attached to the possibility of developing fish culture there. The Prime Minister, Prince Souvanna Phouma, showed great interest in the possibility of his Government forming a fisheries section.

Dr. Miles talked about plans for fish culture extension work in Viet-Nam and general fisheries work with the District Officers for South, Central and North Viet-Nam. He visited the fishing centers and fish culture establishments in North Viet-Nam ; he also visited the site of a proposed fish culture station and small privately owned ponds near Saigon, and the Nha Trang Oceanographic Institute where he discussed IPFC work with the Acting Director, R. Serene, and with other fisheries officers. He held discussions with Harry Timmis, STEM Fisheries Expert, on various aspects of the technical assistance programs there. He also discussed the sending of Vietnamese trainees to the Thai fish culture training center.

In Cambodia, Dr. Miles visited several barriers at Kompong Chnang. He discussed the proposed fish culture station near Phnom Penh and other matters with fisheries officials. He visited the National Fisheries Research Institute.

General Fish Culture Training Course for Thai Fisheries Officers

The second session of the training course was held at the Bangkhen Fisheries Station, from 14 May to 30 June 1953, under the direction of Nai Boon Indrambarya, Director of Fisheries of Thailand. The course was arranged through the joint efforts of the Thai Government, FAO, and the U.S. Special Technical and Economic Mission officers in Thailand and Viet-Nam. S.W. Ling, FAO-ETAP expert, served as the chief instructor and technical adviser. Instructors and assistants included Chinda Thiemmedh, Prida Kanasoot, Ariya Sithimung, Sanai Dontri, and Daung Techakamol, all Thai Government fisheries workers. Lectures were also given by Dr. Miles and Dr. Job of FAO. One Burmese, twenty-two Thai, and two Vietnamese participants attended the course which covered a general review of the fresh water fish of Thailand, general fisheries biology, principles of fresh water biology, fish culture problems in ponds, utilization of swamps, and other natural waters for the production of fish, culture of fish in paddy fields, problems of finding suitable indigenous fish for culturing, fish culture extension services, and literature and equipment.

Indo-Pacific Fisheries Council (IPFC)

The Executive Committee met in Tokyo, Japan, 9-15 April 1953. Attending were R. Serene (Viet-Nam), Chairman ; Nai Boon Indrambarya (Thailand), vice-chairman ; Dr. D. V. Villadolid (Philippines), past chairman ; and Dr. Cecil Miles (FAO), Secretary.

Besides discussing the report of the IPFC, representation at the FAO pre-conference regional meeting, the work of the various technical committees and sub-committees, and administrative questions, the Committee considered arrangements for the next meeting of the Council to be held in Bangkok, Thailand, in January 1954, and publications.

The IPFC is planning a series of handbooks on various aspects of fishery science. The first two of these, Field Procedures and Statistics, are expected to be ready for publication before the end of 1953. The Council is also collaborating in the preparation of the Register of Fisheries Institutions in the Indo-Pacific region, which it is hoped will be published early in 1954. Further discussions were held regarding the proposed oceanographic program for the Indo-Pacific. Dr. Wolsky of UNESCO participated in these. It was again stressed that the aim of the program would not be to repeat work already being undertaken at the national level, but to assist in filling many gaps in the knowledge and to co-ordinate existing programs. Discussions regarding co-operation with UNESCO on scholarships and on the publication of taxonomic charts and with ECAFE on the publication of its manual on flood control were also held. Plans for holding further training centers in the area were reviewed.

The next meeting of the Executive Committee is being planned for Manila, Philippines, in November 1953.

The next meeting of the IPFC will be held in Bangkok, Thailand, in January 1954.

En route from the Executive Committee Meeting, Dr. Miles held discussions with T. Gorazdowski, Fisheries Officer, Department of Agriculture, Fisheries and Forestry, Hong Kong Government, and J. Cater, Director of Co operative and Marketing Department (formerly the Fish Marketing Organization), in regard to a proposed fish marketing school. On 29 April he visited the Portuguese Colony of Macau and held discussions regarding the fisheries there with the competent officer. Great interest was shown by the Governor, Comodoro Joaquim Marques Esparteiro, in the organization of fisheries administration matters in the Colony and in the work of the IPFC.

Expanded Technical Assistance Program

Brazil. Negotiations are still under way with the Government for the provision during 1954 of experts in biology, experimental fishing and processing of fish.

British Guiana. A local fisheries official who is a graduate of the University of Wisconsin, W. H. L. Allsopp, will leave in July to take up a six month's fellowship to study fish culture practices in Indonesia and other parts of the Far East and in Israel, Haiti and Brazil, with a view to considering which of the techniques in operation in these countries are most suitable for introduction in his own country.

Ceylon. Alan Glanville (U. K.) and E. R. Kvaran (Iceland) are continuing their work in inshore fisheries, craft mechanization, the organization of engine inspection and workshop procedures to ensure that mechanical and mechanized craft will be maintained in good working order. Nick Cavell, Administrator in Canada of the Colombo

Plan, visited the Fisheries Division to discuss the co-ordination of the Colombo Plan with the FAO program in Ceylon to ensure that there will be no duplication of effort.

Chile. At the urgent request of the Government which will share the cost of the extension, J. Fridthjof's (Denmark) assignment has been extended to the end of 1953, to continue his work on increasing fish consumption. Dr. F. de Buen (Mexico) is carrying on the biological investigations begun by Dr. E. Poulsen (Denmark) on the extent of the resources available to Chilean fishermen.

Dominican Republic. S. Y. Lin (China) has proposed a three year plan for the development of fish culture and this has been adopted by the Government; construction has already begun on experimental ponds from which privately operated ponds will be stocked in the future. Initial stocking will be provided from the ponds established in Haiti under the FAO program.

The people of the Caribbean prefer large fish. For this reason carp, with a small quantity of *tilapia*, are being used. Mr. Lin will also carry out an extension program of helping both estate owners and small farmers to establish fish ponds of their own.

Ecuador. E. Schweigger (Peru) continues preparing his report.

Finland. In order to further the development of the fisheries of Finland and following the recommendations of A. C. Taft (U.S.A.), the following Fellows were selected:

1. E. Halme, Chief of the Bureau of Fisheries Research, to study fish refrigeration at the University of Washington School of Fisheries, Seattle, Washington, U.S.A.
2. T. Kaartotie, Deputy Councilor of the Division of Fisheries, to study administration and management of marine and fresh water fisheries in the United States and Canada.
3. S.M. Muotiala, engineer, to study fisheries engineering.
4. O. Nikkila, a food chemist, to study canning, preservation, and quick freezing of fish, and the use of fish by-products and wastes in the United States, Canada and Europe.
5. E. Siltama, government fisheries worker, to study management of fish hatcheries at the University of Michigan, Ann Arbor, Michigan, U.S.A.
6. D.A.L. Wikstrom, Deputy Councilor of Fisheries, to study fisheries administration and statistics in Norway, Germany, Denmark and Canada.

Haiti. The President of the Republic recently constructed a large fish pond on his own land as a demonstration project. The President's wife, with the assistance of Shimon Tal (Israel), planted a number of fish fry. Fish culture has captured the eye of many farmers in the country. Arrangements are now being made to introduce fast-

growing strains of carp from Israel. Acclimatization experiments are still being continued on punten carp and *tilapia* which were previously introduced into the country.

India. The report of M. O. Kristensen (Norway), the commercial fisheries consultant advising on the program of the pilot deep sea fishing scheme, has been transmitted to the Government. F. Botke (Netherlands) has returned to Rome and completed his report which will be transmitted shortly to the Government. He demonstrated that water hyacinth could be eradicated from enclosed areas and if this program could be intensified considerable acreages of tanks and bheels could be made much more productive by the culture of fish. W. F. L. van der Heyden (Netherlands) has carried out experimental fishing in the Sunderbans area. Further fishing gear is being sent to him for his experiments. He is also examining the practicability of instituting a system of fish collection and distribution to enable fishermen to market their catch more easily. Recruitment is still in progress to provide a fisheries engineer and a naval architect.

Indonesia. Frank Firth of the TCA, en route to the United States from Indonesia, discussed the fisheries programs there with the FAO headquarters' staff.

Iraq. The Government requested the extension of the assignment of A. van den Eelaart (Netherlands), but FAO had to decline because of insufficient funds for this year. It is hoped that this work can be resumed in 1954 with special reference to a comprehensive program for the construction of fish dams and passes, to enable migratory species to move freely up and down the rivers of the country. Van den Eelaart will return to Rome in July. Similarly, the assignment of G. Amodeo (Italy) could not be extended and he, too, will be in Rome during July.

Israel. G. Napier (U.S.A.) was in Rome in June and completed his report in which he indicated how the vessels now operating in Israel could be put to more effective use. He caught some tuna fish which may lead to some development in pelagic fisheries and he developed gear for use in the fishery of Lake Tiberius. This latter has already had a marked effect on production. A. E. Hofstede (Netherlands) is bringing his experience of fish culture practices in the Far East to bear on fish culture problems in Israel, where the culture of carp has already reached a high level of production. He is endeavoring to devise a means of diversifying fish culture practices there by the introduction of species of fish used successfully elsewhere.

Fellowships have been awarded to I. Schmalinski, a master fisherman, to study trawling methods in Italy, Greece, Spain and Holland, and to Y. Ariav, also a master fisherman, to study pelagic fishing methods in Yugoslavia and Spain.

Liberia. H. van Pel (Netherlands) has returned to Liberia following his leave in Holland. He and J. van Pel (Netherlands) have created a nucleus of a fishing station — a small jetty, a small market shed

for distribution of the catch, a smokehouse and other ancillary buildings having been constructed. Headquarters specialists have found the appearance, flavor and keeping quality of the samples of fish he has smoked were all good. The development of an industry to process and ship processed fish up-country is hampered only by the lack of raw material. This difficulty is being energetically tackled by H. van Pel with the wholehearted support of the Government, which is hoping that a small group will begin operations using the gear which H. van Pel has introduced. The President of Liberia and his wife have shown great personal interest in these activities. J. van Pel is at present on leave in Holland.

Pakistan, East. The report of N. Jangaard (Norway) and H. Fibiger (Denmark) has been forwarded to the Government to assist the fisheries authorities there in drawing up their program for improving fish marketing in East Bengal.

Pakistan, West. Kurt Ohlsson (Sweden) has taken up his duties in Rome. He is working on material assembled by K. H. Magnusson (Sweden) under Jan-Olof Traung's direction. It is hoped to have tank tests on models of Pakistani fishing vessels completed later in the year. From results of these tank tests it is proposed to develop a motor fishing craft of a general type familiar to Pakistani fishermen, but adapted to make the best use of power both for propulsion and gear handling.

Panama. L. Scattergood (U.S.A.) is continuing his work on the shrimp fishery resources.

Philippines. Because all funds for 1953 have been allocated, a request to supply a fisheries gear technologist and a fisheries biologist has had to be deferred for consideration in 1954.

Saudi Arabia. L. Farina (Italy) has returned from his assignment while Dr. M. K. el Saby (Egypt) is continuing the fishing operations in the motor fishing vessel *Peppino*, chartered by the Government. Dr. el Saby will be in Rome during July.

Somalia. The results of exploratory fishing during the last season are being analyzed. Meanwhile, the Government of Italy on behalf of the Trust Territory of Somalia has requested FAO to resume this project next season. This request is being considered in the light of findings on the first season's work (*See* also pp. 119-121).

Thailand. S. W. Ling (China) has been giving in-service training to 20 or 30 Thai fisheries officers. This culminated in a training center which was conducted entirely by the Thai Government under the direction of S. W. Ling (*see* also p. 141). This training and the training center have given a marked stimulus to the development of the fisheries extension service, by means of which peasant farmers from many different parts of the country are introduced to new techniques, and receive technical advice in improving production in their own fish ponds. This advice is essentially practical because the fisheries officers have been taken by Ling through every phase of the handling

and management of fish in ponds under the special circumstances existing in Thailand.

Fisheries extension services carried out at the various prisons have enabled the prisoners to learn some useful occupation, besides converting idle ponds into useful fish producing ones. As far as possible a similar scheme is expected to be conducted at the Armed Forces camps.

The development of fish farming among peasant farmers has been accelerated by the distribution of hundreds of thousands of *tilapia* fry from brood stocks, built up and maintained under Mr. Ling's direction. The pond of the Royal Summer Palace was stocked with fish in the presence of the King and Queen. A scheme for stocking *tilapia* and common carp in the ditches of the vegetable and fruit farms in Thonburi and the Bangkok area has made steady progress. A similar scheme is expected to be started at Amphur Amphowa where there are about 2,000 acres of good vegetable farm ditches. Under the management of the local fisheries officer, about two acres of these ditches are expected to be converted into breeding ponds for producing the necessary quantity of stocking material for distribution in this area.

Steps towards the establishment of a field service station for servicing the northern part of the country have already been taken. Activities in stocking fish in public ponds, lakes, moats, tanks and suitable swamps have been continued. Public interest in this fish culture work is evidenced by the numerous requests from both private individuals and government authorities for assistance in pond construction and conversion, and for the supply of stocking material. Work is also progressing on the experiment in culturing fish in rice fields at the Rangsit Agriculture Experimental Station.

Turkey. The Government has decided to establish a four-ton per hour fish meal plant at Trabzon and the FAO experts have been working on the various aspects of this scheme, examining the size of the resource and its suitability for meal production, and drawing up specifications for the plant. Dr. G. A. Rounsefell (U.S.A.) has been accomodated in the Hydrobiological Institute for Istanbul. Arising out of Dr. Rounsefell's work there has been a proposal to conduct a national training center in fisheries biology later this year. T. B. Lexow (Norway) is fully engaged in the fish meal project. H. Bergs (Iceland) has just completed an extensive tour of some other fish producing areas and has seen many cold storage and ice plant installations.

Yugoslavia. Dr. W. Wunder (Germany) will make a second field trip to Yugoslavia later this year; an interim report will shortly be transmitted to the Government. W. A. MacCallum (Canada) has assumed his duties as a specialist of fish refrigeration and cold storage. He has already visited most of the existing cold storage installations of the country. A fellowship has been provided to R. Mikulić, a fisheries technologist, starting 1 July to study fish canning in Denmark, Germany, Belgium, France and French North Africa. It is hoped to provide another fellowship for the study of fisheries refrigeration in Denmark and Sweden.

Notes on Films

TRAWLS IN ACTION II* Producer: Ministry of Agriculture and Fisheries, 3 Whitehall Place, London, S.W.1., with Basic Films Ltd. Technical data: 16 mm. and 35 mm., black and white, sound, 978 feet (16 mm.), 27 minutes running time, titles in English. Produced in 1952. Price: £ 8.17.6d. (approx.), obtainable through the Chief Inspector of Fisheries, Ministry of Agriculture and Fisheries. London.

From the beginning of trawling, fishermen have had to figure out the shape and behavior of their trawls in action on the bottom of the sea from various indirect tell-tale signs.

This underwater film, showing four different trawls in action under given sets of conditions as to trawling speed, depth, length of warps, length of bridles, floats, footrope weight, etc., answers several questions which have long been debated, for instance, the opening of the meshes in all parts of the net, the fishing width and height of the trawl with various types and numbers of floats, etc.

The article "Comparative Studies of Trawl Behaviour by Underwater Observation" in *World Fishing*, Vol. 1, No. 4, July 1952 (*see World Fisheries Abstracts*, Vol. 4, No. 1, Jan./Feb. 1953, p. 17), gives a thorough and detailed description of the gear used, the operating conditions, observations and measurements made during the filming.

Seeking clear water and bright sunlight for effective cine-photography by the 'frogmen', the film was made near Malta on sand bottom in about 12 fathoms. Due to scarcity of fish, no conclusive observations could be made on the behavior of fish towards the gear. It is to be hoped that another time some light will be thrown on that immensely interesting subject. H. K.

DAS MÄNNERSCHIFF [A Ship for Sturdy Men]. Producer: Kultur- und Lehrfilm Institut, Klemens Lindenau, Delmenhorst, Germany. Distributor: Prisma-Filmverleih G.m.b.H., Frankfurt/Main, Germany. Technical data: 35 mm. and 16 mm., black and white, sound, 431 m., 16 minutes running time, commentary and titles in German. Produced in 1951. Price: 16 mm., DM. 500; 35 mm., DM. 400.

Shows life of the crew on board a rather small prewar-built German distant-water trawler fishing in windlashed seas between Iceland and Greenland.

Hauling of the gear is shown, illustrating a somewhat less mechanized handling of the trawl than is now commonly employed on modern distant-water trawlers. H. K.

* THE TRAWL IN ACTION I, 16 mm., silent, produced 1950. Reviewed in *FAO Fisheries Bulletin*, Vol. 5, No. 1, p. 31, Jan/Feb 1952.

Notes on Publications

FWS 9.6 PUBLICATIONS — FISHERIES TECHNOLOGY UDC 05 : 664.95.001.5

Food and Agriculture Organization of the United Nations. FISHERIES
1952 TECHNOLOGY LITERATURE (Supplement to World Fisheries Abstracts, Vol. 3). Viale delle Terme di Caracalla, Rome, Italy. 48 pp. In English, French and Spanish.

Reviews over 200 textbooks and other separate publications from 24 countries, mostly published within the last 20 years, and covering the whole field of fisheries technology, including fishing boats, fishing methods and gear, fish handling, refrigeration, canning, food technology in general and fish preservation in particular, by-products, seaweeds, food analysis and inspection, sanitation, chemical composition of fish, vitamins. The reviews may be cut out and filed in the *World Fisheries Abstracts* files.

FWS 9.2 FISHERIES STATISTICS UDC 31 : 639.2

Food and Agriculture Organization of the United Nations. YEARBOOK
1953 OF FISHERIES STATISTICS, 1950-51. FAO, Rome, Italy. 296 pp., tables. In English and French, with a Spanish supplement. Price : U.S.$3.50, 17s. 6d., or the equivalent in local currency.

Continues, revises and expands the statistics which were published in the two earlier Yearbooks on catches, utilization and external trade in fisheries products and products derived from related industries, and fishing craft. For a full review *see FAO Fisheries Bulletin*, Vol. 6, No. 3, May-June 1953, pp. 98-99).

FWS 9.2 FISHERIES STATISTICS — U.S.A. UDC 31 : 639.2 (73)

California Division of Fish and Game, Bureau of Marine Fisheries. THE
1952 COMMERCIAL FISH CATCH OF CALIFORNIA FOR THE YEAR 1950 WITH A DESCRIPTION OF METHODS USED IN COLLECTING AND COMPILING STATISTICS. *Fish Bulletin* No. 86. Bureau of Marine Fisheries, Sacramento, California, U.S.A. 120 pp., illus., tables. In English.

Presents, together with current statistics, a record of the changes which have been made in the forms and in the routine of collecting and processing the statistics of California's fish catch. Specific problems are discussed and an attempt made to explain how the statistical unit has kept pace with a changing and expanding industry.

FWS 9.3 FISHERY PRODUCTS, LAWS AND REGULATIONS UDC 34 : 637.56
34 : 664.95

Hess, Ernest. Commodity Standards for Fisheries Products. *FAO* 1953 *Fisheries Study*, No. 2. Food and Agriculture Organization of the United Nations, Rome, Italy. 157 pp., tables. In English, French and Spanish. Price : U.S.$2.00, 10s. 0d. or equivalent in local currency.

A digest of current laws and regulations concerning standards of containers and packaging, weights, quality, and description as well as those concerning control of production for export and export and import control. Contains information obtained from 32 countries and international organizations.

FWS 9.3 FISHERIES LAWS AND REGULATIONS — ITALY UDC 34 : 639.2 (45)

Monzali, Gaetano. Legislazione sulla Pesca e Commercio dei Prodotti 1952 Ittici in Italia [Legislation on Fisheries and the Trade in Fish Products in Italy]. Tipografia G. Pettigli, Rome, Italy. 40 pp. In Italian.

A review of the basic Italian laws on inland and marine fisheries under the various aspects of the administrative structure, qualifications and organization of fishermen, water police and marketing. Details of the principal regulations and explanatory notes of the strictly legal matter are given.

A brief historical introduction traces the lines of Roman law, the development during the Middle Ages, mainly regarding freedom of the seas, and connects those fundamental principles with modern Italian legislation. Also shows the influence of the improvement in deep sea fisheries and recent biological knowledge. Due regard is given to the development of fish culture practices and regulations. The review ends with wholesale marketing legislation.

FWS 9.4 INTERNATIONAL AGENCIES UDC 341.1

Inter-American Tropical Tuna Commission. Annual Report for the 1952 Years 1950 and 1951. La Jolla, California, U.S.A. 58 pp., 1 fig., 4 appendices. In English and Spanish.

Contains information on the functions, duties and responsibilities of the Commission. A description of the work conducted during 1951, and transcripts of the Convention and the legislation approved for the establishment of the Commission, are given in appendices.

FWS 9.4 INTERNATIONAL AGENCIES UDC 341.1

International Commission for the Northwest Atlantic Fisheries. Second 1952 Annual Report for the Year 1951-52. St. Andrews, New Brunswick, Canada. 68 pp., 8 fig., tables. In English.

Contains the Administrative Report for the year ending 30 June 1952, a report of the Second Annual Meeting, a paper on mesh regulation to increase the yield of the George's Bank haddock fishery, and statistics of landings of groundfish from the Convention Area. The paper on mesh regulation (by Herbert W. Graham) briefly reviews the status of the fishery and examines technological and biological evidence on the exploitation of the stocks.

United Nations, Legal Department. Laws and Regulations on the
1951, Regime of the High Seas. *United Nations Legislative Series*
1952 ST/LEG/SER. B/1 and B/2. Division for the Development and Codification of International Law, Legal Department, United Nations, New York. Vol. I-1951, 307 pp., Sales No. 1951. V. 2, U.S.$3.50; Vol. II-1952, 142 pp., Sales No. 1952. V. 1, U.S.$2.50 or 12s. 6d. In English.

The preparation of these two volumes on the regime of the high seas resulted from recommendations of the International Law Commission in its July 1950 report. Part 1 of Volume I presents national legislation (laws, legislative decrees, regulations, orders, declarations, proclamations, etc.) and international treaties and supplementary legislation dealing with the *continental shelf*. Part 2 deals with national legislation, multipartite and tripartite international treatise and supplementary legislation on *contiguous zones*. Part 3 presents, firstly, international fisheries treaties, conventions, agreements, etc., and subsequently other treaties relating to the *supervision of foreign craft on the high seas* and related legislation. Volume II presents, for 61 countries, their general and special provisions (as well as additional information) on criminal jurisdiction over crimes committed on the high seas or abroad.

FWS 9.67 FISHERIES EDUCATION — FILMS UDC 371.33 : 639.2

Jul, Mogens, and Fenn, D. List of Films — Fisheries and Related
1953 Subjects. Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy. 59 pp. Mimeo. In English. Free.

Contains references to about 180 films on fisheries or related subjects. The list gives addresses of distributors, rental and purchase conditions, summary of contents, etc.

FWS 9.1 FRESH WATER BIOLOGY — EUROPE UDC 57 (4)

Dottrens, Emile. Poissons d'eau douce [Fresh Water Fishes]. I. Des
1951 lamproies aux salmonidés. Delachaux & Niestlé, S. A., 4, rue de l'Hôpital, Neuchâtel, Switzerland. Vol. 1. 181 pp., illus. In French.

The first of two volumes. The first part deals with fish in general, their appearance and movements, fins, anatomy and physiology, while the second part gives a classification of fish and a description of the different species living in western Europe, especially in Switzerland and deals with the biology, spawning and behavior of these species, with indications for fishing. Vernacular names in English, German and Italian are quoted.

FWS 9.1 MARINE BIOLOGY — JAPAN UDC 57 (52)

Niino, Hiroshi. On the Bottom Deposits of the Banks at the Mouth
1950 of Wakasa Bay and on the Adjacent Continental Shelf. *Journal of the Tokyo University of Fisheries* (Tokyo University of Fisheries, Kurihama, Yokosuka, Japan), Vol. 37, No. 1. 274 pp. In Japanese, with English summary.

An extensive account of the analysis of bottom samples taken from 623 stations on the banks, shelves and continental shelf generally at the mouth of the Wakasa Bay and in the neighborhood thereof. The analyses refer to the organisms collected and to biological material.

FWS 1.8 MOLLUSKS — U.S.A. UDC 594 (73)

Fitch, J. E. Common Marine Bivalves of California. *Fish Bulletin* 1953 No. 90, Department of Fish and Game, Marine Fisheries Branch, Sacramento, California, U.S.A. 106 pp., illus. In English.

Sixty marine bivalves in California are described and illustrated. There is a photograph and description of each type, together with a report of its range, habits and use. The introductory section of the paper includes a general account of the anatomy, reproduction, ecology and economics of bivalves, and a key is given to the 60 species, which represent 15 percent of those known from the Californian coast.

FWS 1 FISHES UDC 597

De Buen, Fernando. Las Familias de Peces de Importancia Económica 1953 [The Families of Fish of Economic Importance]. Food and Agriculture Organization of the United Nations, Regional Office, Santiago, Chile. 311 pp., illus., bibl. In Spanish.

A systematic examination of the economically important families of fish with special reference to those of the Americas. The introductory chapters give a brief account of the anatomy, physiology and ecology of fish generally. Contains many illustrations and a substantial bibliography

FWS 9.1 FISHES UDC 597

Myklebust, Bjørn. Fiskeri Biologi [Fishery Biology]. Fabritius & 1952 Sønners Forlag, Oslo, Norway. 233 pp., figs. In Norwegian.

Prepared as a textbook for Norwegian master fisherman schools, this work is in three parts, dealing respectively with the general biology of fish, including the anatomy, physiology, reproduction, growth and nutrition; the biology of various commercially important species and groups of species, especially the herring and cod; and general management of fish stocks.

FWS 1.0112 FISHES — ALASKA UDC 597 (798)

Wigutoff, Norman B. Common or Local Names of Commercial Fish 1953 and Shellfish of Alaska. *Fishery Leaflet* 413. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. 4 pp. In English. Free.

Gives the various common names and the scientific name along with a suggested common name to be used as a common denominator for the fishes and shellfishes of Alaska.

FWS 1.2 HERRINGS, ETC. — SPAIN UDC 597.5 (46)

Navaz, J.M., and Navarro, F. de P. Nuevas Observaciones sobre la Sar- 1952 dina del Golfo de Vizcaya (1951) y Consideraciones sobre la Estadística de Pesca [Further Observations on the Sardine of the Bay of Biscay (1951) and Notes on Fisheries Statistics]. *Publicaciones* No. X. Sociedad de Oceanografía de Guipuzcoa, San Sebastian, Spain. 18 pp. In Spanish.

Reports investigations on the sardine occurring in the Bay of Biscay including an examination of the length frequencies, the weight and ponderal index, sexual characters, vertebral formula and the condition of the fishery. Concludes that there are two populations differing one from the other in length, spawning and vertebral formula.

Vom Wasser. Ein Jahrbuch für Wasserchemie und Wasserreinigungs-
1953 technik [Water — A Yearbook of Water Chemistry and Water Purification]. Verlag Chemie, GmbH., Bergstrasse, Weinheim, Germany. Vol. 19, 1952. 416 + 52 pp., illus., tables, maps. In German. Price : DM. 29.80.

No. 19 in the series of yearbooks of water chemistry and water purification, edited by the Committee on Water Chemistry of the Union of German Chemists. Contains the proceedings of the "water meeting" held in Essen, 11-15 September 1951, organized by a group of 12 associations interested in water, its properties and utilization. Also contains 23 articles on subjects related to the use of water for technical, agricultural and fish cultural purposes. One article, by O. K. Trahms, gives a comprehensive description of the inland fisheries and the fish culture practices in Western Germany (review of Vol. 18, *see FAO Fisheries Bulletin*, Vol. 5, No. 5, p. 210).

FWS 2.115 BOAT BUILDING UDC 629.12

Derwin, H. Traité pratique pour la construction des bateaux en bois
1950 [Practical Treatise on the Construction of Wooden Boats]. Vol. 1, Du kayak au bâtiment de charge. 3rd. ed. Société d'éditions géographiques, maritimes et coloniales, 17 rue Jacob, Paris 6. 280 pp., illus. In French. Price : F. Fr. 1,200.

This volume, from kayaks to cargo vessels, is devoted to the construction of small wooden boats. A revised and enlarged edition, it deals with the theory of framework, the study of materials, different methods of construction, as well as special constructions. The second part deals with the construction operations and an appendix describes modern techniques in the use of wood. Numerous illustrations give construction details and the plans for several boats.

FWS 1.01 FISHERIES UDC 639.2

Marine and Fisheries Engineering Research Institute, Inc. The Relation
1952 of Oceanography and Engineering to an Expanding World Fishery. Woods Hole, Massachusetts, U.S.A. 29 pp. In English.

The purpose of this report is stated to be "to examine the problem of increasing the world's present food supplies from the sea, to outline the significant features of the fishing industry and the principal directions along which it can expand, to set forth those services which oceanography can render in aid of such expansion, and to indicate ways in which a world fishery of increasing scope and importance will continuously develop new problems which oceanography and marine engineering must solve."

Production from various fishing areas is discussed as are various important fishing methods. The roles of oceanography (in its widest sense) in surveying the resource, and of engineering in designing craft and equipment, are examined.

FWS 9.16 FISHERIES MANAGEMENT UDC 639.2

Rounsefell, George A. and Everhart, W. Harry. Fishery Science —
1953 Its Methods and Applications. John Wiley & Sons, Inc., 440 Fourth Ave., New York, 16. Chapman & Hall, London. xii-444 pp., fig. In English. Price : U.S.$7.50.

This work essays to deal with fishery science as a whole. It treats both inland and marine fisheries and deals with both from the point of

view of problems to be solved — the research, development and administration which must be undertaken to achieve a solution. It is essentially a text on fishery management, beginning with the identification and census of populations and describing the biological research which is required for an understanding of variations in population size, and especially of the effect of fishing. Fish ponds and fishing gear, are described; the steps to protect stock in inland waters and to improve the habitat are discussed, and there is a chapter on fishery management as such.

FWS 1.01 FISHERIES — MEDITERRANEAN SEA UDC 639.2 (262)

General Fisheries Council for the Mediterranean. *Information Bulletin*, 1953 No. 1, May 1953. Food and Agriculture Organization of the United Nations, Rome, Italy. 10 pp. Mimeo. English and French editions. Free.

Currently published irregularly. The aim of the bulletin is to keep members informed of the activities of the Council and to maintain the active liaison which is necessary for the efficient operations of the Council. In addition to the activities of the Council, the bulletin will include articles on FAO activities in the region as well as short administrative, technical, statistical or other notes concerning the Mediterranean countries.

FWS 1.01 FISHERIES — MEDITERRANEAN SEA UDC 639.2 (262)

General Fisheries Council for the Mediterranean. PROCEEDINGS. TECH-1952 NICAL PAPERS. Food and Agriculture Organization of the United Nations, Rome, Italy. 99 pp. In English and French. Free limited distribution in the Mediterranean region.

Contains the summary record of the first meeting of the Council held at Rhodes, Greece, 21-24 July 1952 and the following technical papers: "Prévention des accidents des scaphandriers" by the Commission for Underwater Research, in collaboration with the Scientific and Technical Office for Marine Fisheries, France; "Les crevettes des côtes d'Algérie," by R. Dieuzeide; "Tables for Computation of Sigma-T for Salinities from 38.00‰ to 41.00‰ and for Temperatures from 13° C. to 31° C." by O. H. Oren; "Perspectives d'utilisation des algues de la Méditerranée," by C. M. Maldura; "Some Observations on the Present State of Pond Fish Culture in Israel," by K. Reich; "L'ouverture du chalut en hauteur," by A. Percier; and "Les pêches en Méditerranée," by the Secretariat of the Council.

Reprints of the technical papers are available.

FWS 1.0147 FISHERIES — GERMANY UDC 639.2 (43)

Germany, Bundesministerium für Ernährung, Landwirtschaft und Forsten. 1952. Jahresbericht über die deutsche Fischerei [ANNUAL REPORT ON THE GERMAN FISHERIES], 1951. Verlag Gebr. Mann, Berlin October 1952. 277 pp. In German.

Consists of three parts dealing with the various aspects of the fisheries of Western Germany. Fisheries policies, the condition of the fishing fleet, biological-statistical report on the catch of the German high seas fisheries, external trade, high seas fishing, the lugger fishery for herring, inland fisheries, fish processing, etc., are among the subjects analyzed (for note on 1950 report, *see FAO Fisheries Bulletin*, Vol. 5, No. 1, p. 35).

FWS 1.015 FISHERIES — SINGAPORE UDC 639.2 (595.13)

Burdon, T. W. Annual Report of the Fisheries Department, Singa-
1952 pore, 1951. Government Publications Bureau, General Post Office, Fullerton Building, Singapore. 93 pp., tables, graphs. In English. Price : Straits $2.00.

Contains a general review of fisheries during 1951, a detailed analysis of problems related to the availability and price of fresh fish, its transport and marketing. Also gives an inventory of the fishing industry and a summary of the first two reports prepared and submitted during 1951 of a survey of the fisheries of the Colony.

FWS 1.015 FISHERIES — SINGAPORE UDC 639.2 (595.13)

Kesteven, G. L., and Burdon, T. W. An Introduction to the Fisheries
1952 Survey of the Colony of Singapore, with a Consideration of the Methodology Employed. *Fisheries Survey Report* No. 1, *Fisheries Bulletin* No. 2. Fisheries Department, Colony of Singapore. Government Publications Bureau, General Post Office, Fullerton Building, Singapore. 118 pp., tables, graphs. In English. Price : Straits $2.00.

The first of a series of reports prepared by the Government of Singapore as a basis to the administration and development of fish marketing of that island. Lists the sets of data available, describes the methods of treatment of the data and makes recommendations for development of a comprehensive statistical system which would allow of effective control of the marketing system. Subsequent reports will deal with gear, boats manpower, etc.

FWS 1 FISHERIES RESEARCH UDC 639.2.001.5

Fisheries Research Board of Canada. Annual Report for the Year
1952 1951. Ottawa, Canada. 185 pp., fig., tables. In English, with section in French.

Contains a short general report of the chairman and vice-chairman, and more detailed reports of the directors of the four biological and three fisheries experimental stations operated by the Board on the Atlantic and Pacific coasts of Canada and in central Canada ; reports on salmon management, Arctic investigations and on the Joint Committee on Oceanography. The seventeen 1951 publications as well as the names of the scientific staff of each station are listed.

FWS 9.1 FISHERIES RESEARCH UDC 639.2.001.5

Poland, Sea Fisheries Research Institute. Reports of the Sea Fisher-
1951 ies Institute in Gdynia. *Report* No. 6. Wydawnictwa Morskie, Gdansk. 173 pp. In Polish.

Contains 11 papers, 5 of which are biological, 1 hydrographical, 4 technological and 1 economic. In addition there is a list of 110 papers published from the Institute between 1932 to 1950. The biological papers deal with cod, herring, plankton, bottom-fauna and the general biological conditions of the Baltic. Technological papers concern cod and herring products.

WS 9.1 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5 (481)

olstad, Knut. Omplantningene av danske rødspetter (*Pleuronectes*
1953 *platessa*) til Oslofjorden og Skagerak 1934 og 1936 [TRANSPLANTATION OF YOUNG DANISH PLAICE TO THE OSLO FJORD AND THE SKAGERRAK 1934 AND 1936]. *Fiskeridirektoratets Skrifter, Serie Havundersøkelser* (Report on Norwegian Fishery and Marine Investigations) (Director of Fisheries, Bergen, Norway), Vol. 9, No. 15. 76 pp., tables, charts. In Norwegian, with English summary.

Gives a review of the successful experiments on the transplantation f plaice, and a specific account of research which has been conducted in rder to establish the results of two transplantations carried out from the anish west coast to Norway. A report is given of tagging work, recap- ire, migration, growth rate and the economic results, which have been ood, particularly in the Oslo Fjord.

WS 1 FISHERIES RESEARCH — JAPAN UDC 639.2.001.5 (52)

apan, Fisheries Agency. SCIENTIFIC RESEARCHES OF FISHERIES CARRIED
1952 ON UNDER FISHERIES AGENCY, JAPANESE GOVERNMENT. Tokyo, Japan. 25 pp., illus. In English.

Gives a list of the fisheries research institutions of Japan (with map howing their location) and briefly describes the work being carried out t each. Photographs are given of laboratories and vessels.

WS 9.1 FISHERIES RESEARCH, BIOLOGICAL — ISRAEL UDC 639.2.001.5 (569.4)

srael, Ministry of Agriculture, Department of Fisheries. *Bulletin* Nos. 1
1951- to 4. Sea Fisheries Research Station, Caesarea. In English.
1952

The bulletins of the Sea Fisheries Research Station, the first of which as published in June 1951, report on research work carried out in Israel n marine biological and limnological subjects. Up to the end of 1952 our bulletins were published : Georg Haas " Preliminary Report on the Iollusks of the Palestine Coastal Shelf ; " A. Ben-Tuvia and H. Steinitz Report on a Collection of Fishes from Eylath (Gulf of Aqaba) Red Sea ; " . H. Oren " The Influence of the Western Wind on the Temperature istribution and Currents of Lake Tiberias ; " and B. Komarovsky " An nalysis of the Stomach Contents of *Acanthobrama terrae sanctae* from ake Tiberias. "

WS 1 FISHERIES RESEARCH — TUNAS, MACKERELS, ETC. UDC 639.2.001.5 : 597.5

ester, Albert L. ; van Weel, P. B. ; Hsiao, Sidney C. ; and Miyake,
1952 Iwao. REACTION OF TUNAS AND OTHER FISHES TO STIMULI. *Special Scientific Report : Fisheries*, No. 91. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C., U.S.A. 83 pp., charts, tables. In English.

This paper is in five parts, the first of which describes the background o the work and summarizes the results. In the subsequent parts accounts re given of experiments to analyse the chemo-reception of tuna, their eaction to artificial light, their response to sounds, and the response of *Kuhlia sandvicensis* to interrupted direct current. The work is of interest

not only for physiological observations on a group of fish of such importance as tuna, but also because of the success in holding such large fish in captivity.

FWS 1.3 SALMONS, ETC. UDC 639.211

Gines, Hno., Marcuzzi, G., and Martin S., F. Observaciones sobre las
1952 Condiciones de Vida de la Trucha en los Andes de Mérida [Observations on the Living Conditions of Trout in the Southern Andes]. *Boletín de Pesca* No. 2, Ministerio de Agricultura y Cría, Caracas, Venezuela. 48 pp., illus. In Spanish.

Gives a geographical, geological, chronological and biological account of the environment and a general account of the biology of the trout which occur in the Southern Andes.

FWS 1.014 FISHERIES INDUSTRIES UDC 639.222.2 (410)
— HERRINGS, ETC. — UNITED KINGDOM

United Kingdom, Herring Industry Board. Eighteenth Annual Re-
1953 port for the Year Ended 31 December 1952. Cmd. 8840. H. M. Stationery Office, London. 42 pp., tables. In English Price : 1s. 6d. net.

Contains a critical account of the results of the winter, summer and autumn herring fisheries during 1952, followed by a description of the statutory and commercial arrangements made in respect of minimum first sale prices and supplies for processing and reduction, with a review of the domestic and export marketing situation.

Other sections deal with the Board's research and development activities in processing, reduction and experimental fishing, and with financial assistance to the fleet. There are statistical tables on catch and utilization, and three appendices dealing with the marketing problem, the reduction factory program, and rules and directions issued in 1952.

FWS 1.85 FISHING — CRUSTACEANS — SHRIMPS UDC 639.282

Springer, Stewart, and Bullis, Harvey R. Exploratory Shrimp Fishing
1952 in the Gulf of Mexico 1950-51. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. 34 pp., tables, illus. Free.

A preliminary report, to be supplemented by data collected during 1952, on biological exploratory work and technical research on fishing operations during 1950 and 1951 on the shrimp resources of the Gulf of Mexico. Describes experiments with various kinds of trawling gear and the results which have been obtained in determining the range of distribution of these resources.

FWS 3.3 CANNING UDC 664.8.036.5

2nd International Congress on Canned Foods. The Permanent
1951 International Committee on Canned Foods, 25 rue du Général Foy, Paris, 8e. In English.

Contains the papers presented at the Congress. Of special interest for fisheries workers are the chapters on technical development of the canning industries in various countries and chapters on the bacteriology of deliberately non-sterile canned foods which contain papers on bacteriology of herring delicatessen and anchovies. Also, a chapter which gives development in the manufacture and use of containers for canned goods, including the use of aluminum cans.

VS 0.6 FISHERIES RESEARCH, TECHNOLOGICAL UDC 664.95.001.5

stitut für Netz und Materialforschung, Hamburg-Altona, Germany.
1951 Protokolle zur Fischereitechnik [Reports on Research in Fisheries Technology], Vol. 4. 28 pp., tables, graphs, bibl., mimeo. In German.

Contains an article by A. von Sengenbusch on the application of fixed ge rates in the industrial manufacture of fishing nets and a research port of E. Schoeniger on the influence of chemical substances romatic oils, camphor) on young eels and the possibility of using bait ntaining these substances in the eel fisheries.

VS 0.6 FISHERIES RESEARCH, TECHNOLOGICAL — DENMARK UDC 664.95.001.5 (489)

nmark, Fiskeriministeriets Forsøgslaboratorium. Årsberetning [Annual
1952 Report of the Technological Research Laboratory of the Ministry of Fisheries], 1952. Copenhagen, Denmark. 20 pp. In Danish, with English summary.

Gives a general review of the experimental work carried out in 1952 the Laboratory, with brief summaries of the results and a list of rks published by the Laboratory during the year.

STABILIMENTO TIPOGRAFICO FAUSTO FAILLI — ROMA